

**RD00-198R1  
DOE/CD-ETEC-4020  
Book 2 of 2**

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# **DRAFT DOCKET**

**FOR THE RELEASE OF THE FORMER BUILDING 4020  
SITE (HOT LABORATORY) AS PART OF THE ENERGY  
TECHNOLOGY ENGINEERING CENTER CLOSURE**

**June 2003**

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**U.S.DEPARTMENT OF ENERGY  
OAKLAND OPERATIONS OFFICE  
ENVIRONMENTAL RESTORATION**

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## **EXHIBIT VI**

### **NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) DOCUMENTATION FOR FACILITY 4020**

## **EXHIBIT VI**

### **NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) DOCUMENTATION FOR DECONTAMINATION AND DECOMMISSIONING OF FACILITY 4020**

**NOTE: Hot Lab Operations were governed by an “Environmental Impact Assessment of Operations at Atomics International” under Special Materials License No. SNM-21, Document No. 83ESG-7043**

**ENVIRONMENTAL IMPACT ASSESSMENT  
OF OPERATIONS AT ATOMICS INTERNATIONAL  
UNDER SPECIAL NUCLEAR MATERIALS LICENSE  
NO. SNM-21**



**Rockwell International**

Atomics International Division  
8900 DeSoto Avenue  
Canoga Park, California 91304

**ENVIRONMENTAL IMPACT ASSESSMENT  
OF OPERATIONS AT ATOMICS INTERNATIONAL  
UNDER SPECIAL NUCLEAR MATERIALS LICENSE  
NO. SNM-21**

**Prepared by the Staff  
of the  
Health, Safety, and Radiation  
Services Department**



**Rockwell International**

Atomics International Division  
8900 DeSoto Avenue  
Canoga Park, California 91304

**ISSUED: APRIL 30, 1976**

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**PART A**  
**SUMMARY INFORMATION**

## I. LOCATION

### A. INTRODUCTION

Atomics International (AI) Division of Rockwell International Corporation maintains facilities at two major Southern California sites. The Headquarters facility, located in Canoga Park, California, is situated approximately 23 miles northwest of downtown Los Angeles. The Nuclear Development Field Laboratory (NDFL) site, located in the Simi Hills of Ventura County, is located approximately 29 miles from Los Angeles.

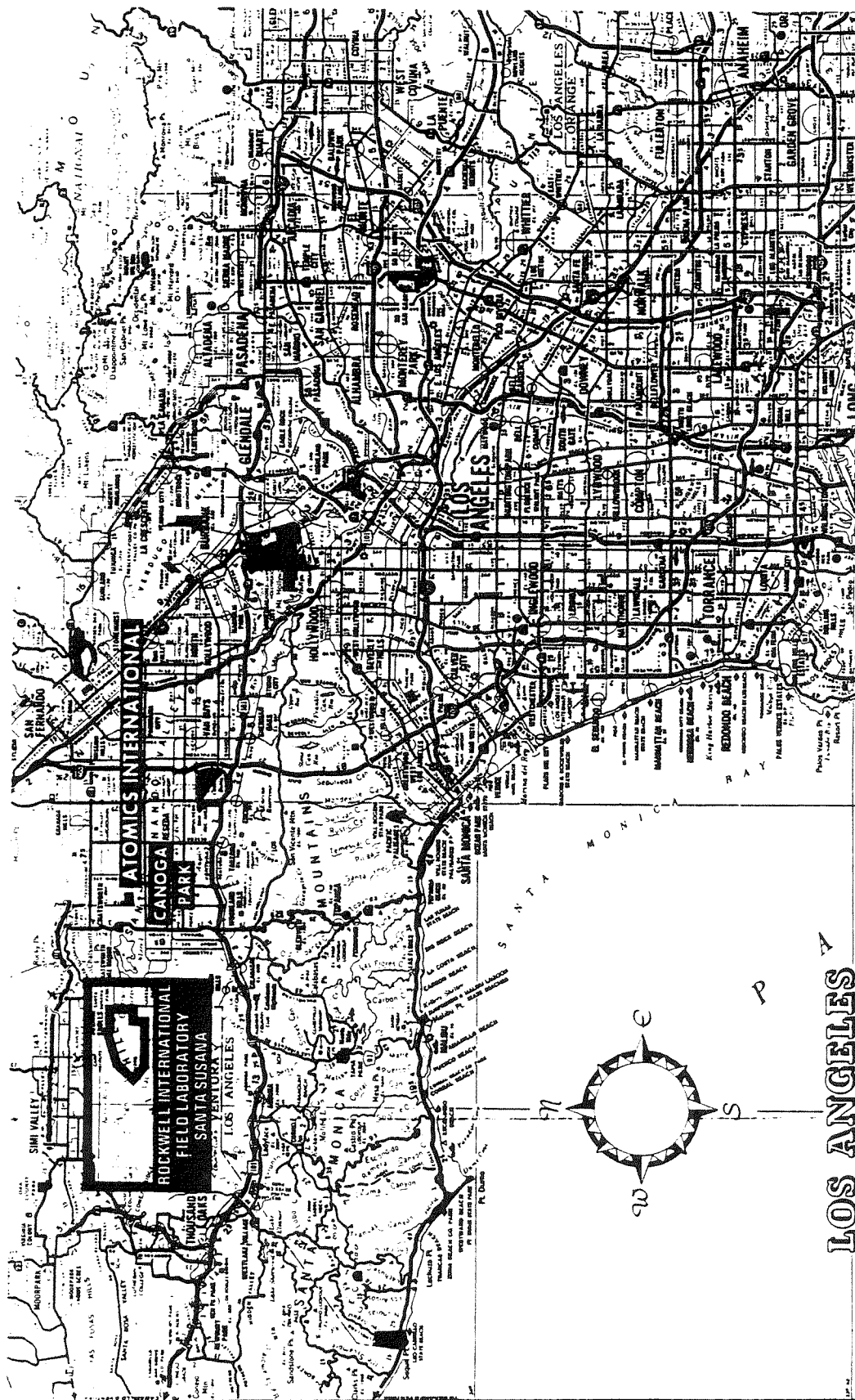
### B. HEADQUARTERS SITE

The Headquarters site is located on DeSoto Avenue in Canoga Park, California, and includes approximately 71.6 acres located in the relatively urban surroundings of the San Fernando Valley. The buildings in which licensed work with nuclear fuel and radioisotope material is performed are located within the site. Canoga Park is situated in the western end of the valley, approximately 25 mi northwest of downtown Los Angeles as shown in Figure A-I-1, a map of the Los Angeles and surrounding area, and in Figure A-I-2 which shows the location with respect to the immediate surroundings.

Figure A-I-3 shows the layout of the Headquarters buildings. The complex is comprised of four principal buildings and several auxiliary buildings; approximately half of the site is undeveloped at present. The principal buildings are numbered 001 through 004; Building 001, the Manufacturing and Development Facility; Building 002, Engineering and Administrative Services, Building 003, Employee Services; and Building 004, Laboratory and Administrative Services. The other buildings provide storage and maintenance services.

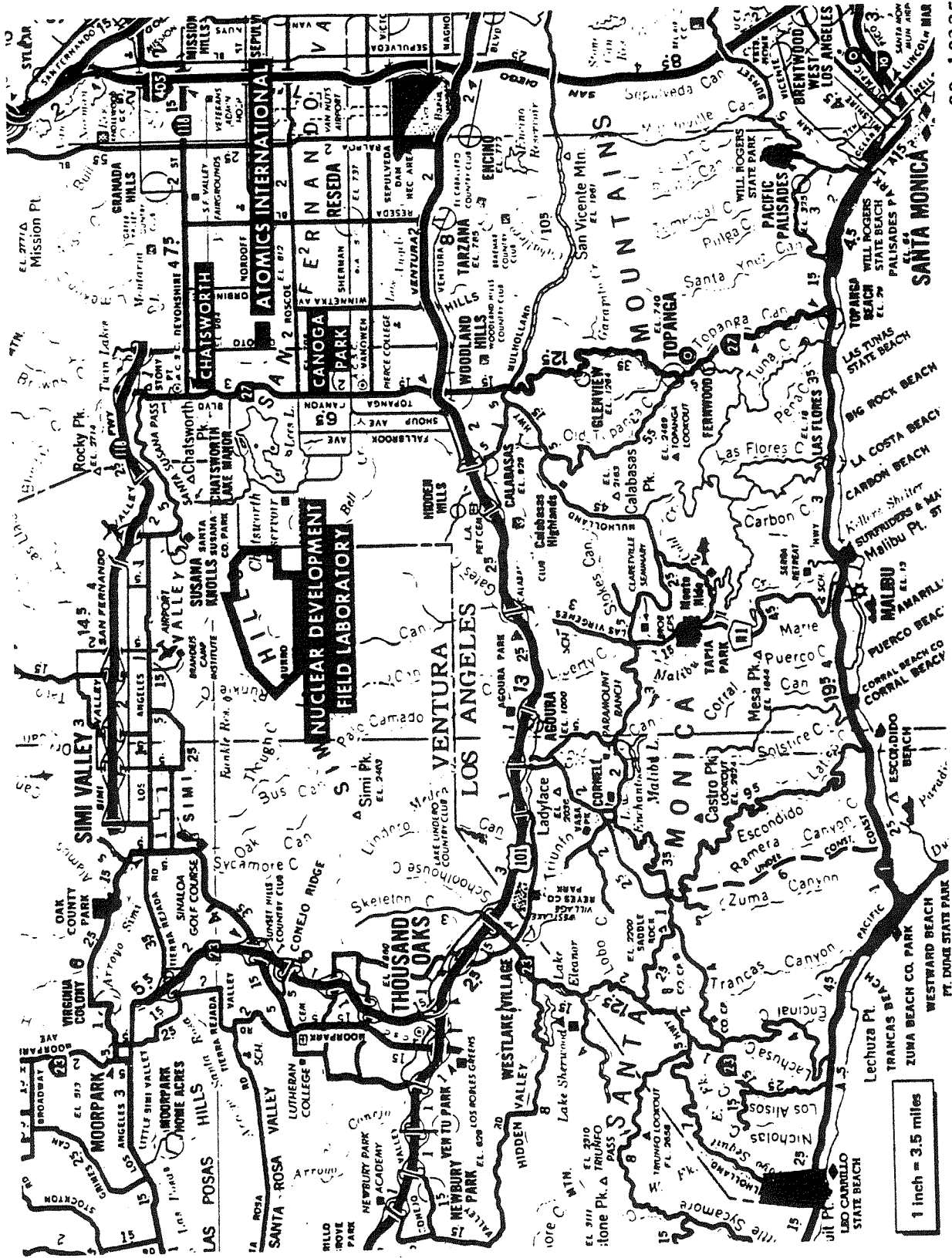
The aerial photograph (Figure A-I-4) looks northeast over a portion of the valley, presenting the Headquarters complex in relation to its surroundings.

The area immediately surrounding the site is composed of widely varying land zoning classifications which include industrial, commercial, agricultural, and multiple and single residential classifications. The aerial photograph illustrates this variation. The Fuel Fabrication Facility, Building 001, is the primary building in which licensed fuel fabrication work is performed. To facilitate



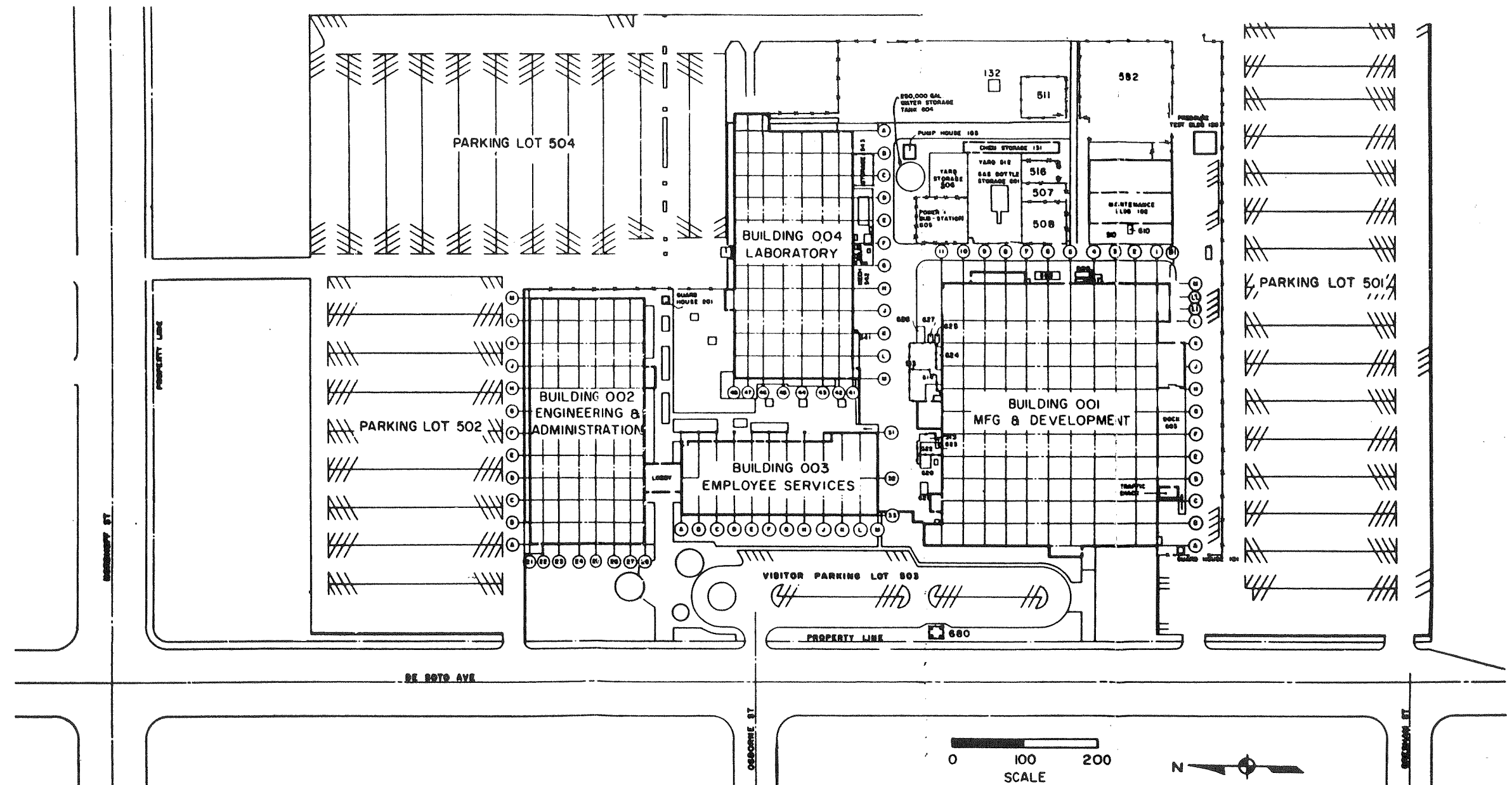
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Figure A-I-1. Map of General Los Angeles Area  
(Copyright Automobile Club of Southern California. Reproduced by Permission)



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Figure A-1-2. Local Map of Area Surrounding Headquarters and Nuclear Development Field Laboratory Site  
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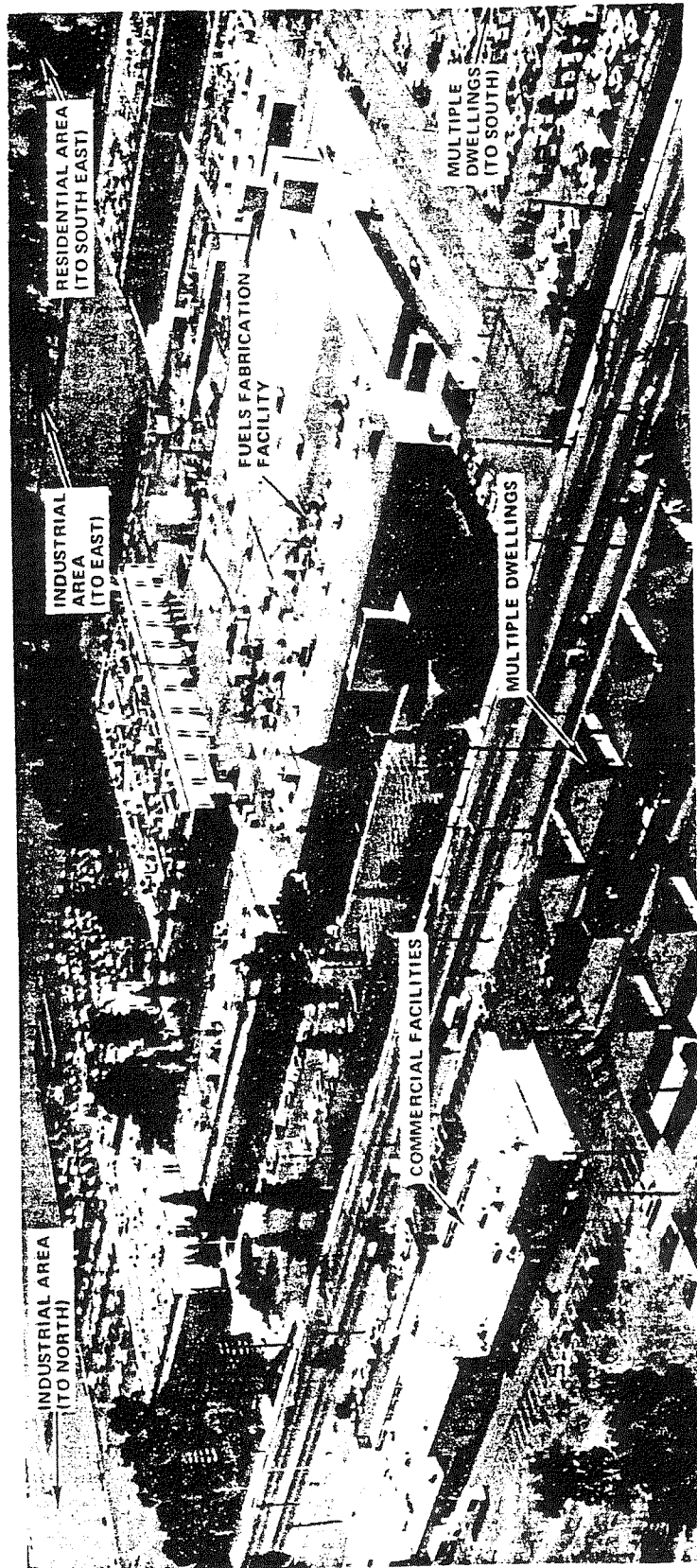


MASTER PLOT PLAN CANOGA FACILITY

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Figure A-I-3. Master Plot Plan,  
Canoga Facility

AI-76-21  
A-I-5



00-10326

Figure A-I-4. Aerial View of Headquarters Site

AI-76-21

A-I-7

the discussion of various off-site locations, Building 001 is used as a reference point. The relationship between Building 001, the other buildings and site boundaries, is also presented.

Directly north, a public street, Nordhoff Avenue, separates the site from a commercial establishment (~1400 ft), from undeveloped land zoned for industrial use, and from two industrial buildings. To the west, at approximately 275 ft from Building 001 and about 140 ft from the site boundary are several small commercial establishments and an area containing both single and multiple family occupancy dwellings. A public street, DeSoto Avenue, lies between these structures and the site. In a southerly direction ~390 ft of site property (a parking lot) separates Building 001 from multiple dwellings. This area is adjacent on the south to a semi-developed residential area. To the east, 410 ft of partially developed site property separate Building 001 from an open area zoned for light industrial use. At 2200 ft east, there is an area utilized for light industrial usage and single family occupancy housing.

Operations involving radioactive and nuclear fuel materials are conducted in Buildings 001 and 004 from which the minimum distances to the nearest site boundary are 135 and 350 ft, respectively. Table A-I-1 describes the minimum distances from these buildings to the nearest site boundary in each cardinal direction.

TABLE A-I-1  
MINIMUM DISTANCES FROM BUILDINGS 001 AND 004  
TO SITE BOUNDARIES  
(ft)

Building	North Boundary	South Boundary	East Boundary	West Boundary
001	1,040	370	410	135
004	775	775	140	340

Buildings 001 and 004 are each separated from the other buildings within the facility by minimum distances ranging from about 100 to 400 ft. Table A-I-2 indicates the minimum distances from each of these buildings to other major buildings within the facility.

TABLE A-I-2  
MINIMUM DISTANCES FROM BUILDINGS 001 AND 004  
TO OTHER CANOGA FACILITY BUILDINGS  
(ft)

Building	Building 001	Building 002	Building 003	Building 004
001	-	400	100	120
004	120	100	100	-

### C. NUCLEAR DEVELOPMENT FIELD LABORATORY

The AI Nuclear Development Field Laboratory (NDFL) location is shown in Figures A-I-1 and A-I-2. The latter figure shows the NDFL in relation to the Rocketdyne Santa Susana Field Test (SSFL) Laboratory. Both areas are controlled by Rockwell International Corporation. The NDFL building layout appears in Figure A-I-5.

The NDFL is located in the southeastern portion of Ventura County, adjacent to the Los Angeles County line (see Figure A-I-2). The site is about 29 mi northwest of downtown Los Angeles.

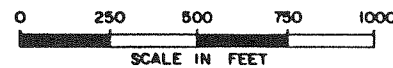
The site lies entirely within a pocket formed by the higher surrounding Simi Hills, affording relative isolation of the NDFL from surrounding communities. Its higher elevation, ranging from 800 to 1000 ft above the populated valley floors, serves to enhance its isolation, as indicated by the aerial photograph shown in Figure A-I-6.

In Figure A-I-5, the boundary of ERDA owned or optioned facilities is delineated by a dashed line. The facilities located inside this area are exempt from licensing. At present, only certain buildings within the NDFL are nuclear facilities outside the ERDA area and in active service. These are Building 020, the Atomics International Hot Laboratory (AIHL); Building 055, the Nuclear Materials Development Facility (NMDF); and Building 093, Neutron Radiography Building which houses the L-85 reactor and is licensed separately. The other buildings are either inactive at present or are used for support functions.

## NUCLEAR DEVELOPMENT FIELD LABORATORIES

**SANTA SUSANA**

**MARCH 1976**



**Figure A-I-5.**  
**NDFL Site — Building Arrangement**

AI-76-21  
A-I-11

OWNED	ZONE	BUILDING NUMBER	DESCRIPTION
ROCKWELL	2B	313	CONSERVATION BUILDING
ROCKWELL	10G	314	LARGE LEAK INJECTOR DEVICE (LLID) TEST CONTROL BUILDING
ROCKWELL	3C	333	TIME CLOCK BUILDING
ROCKWELL	7G	343	TIME CLOCK BUILDING
ROCKWELL	353	7H	RESEARCH AND DEVELOPMENT LABORATORY BUILDING
GOVT.	6E	364	CONTROL ELEMENT TEST STRUCTURE
GOVT.	7D	355	SCIT CONTROL BUILDING
GOVT.	7D	356	SODIUM COMPONENT TEST INSTALLATION
GOVT.	7D	357	LMCC PUMP BEARING TEST FACILITY CONTROL BUILDING
GOVT.	7E	358	CHEMICAL STORAGE BUILDING
ROCKWELL	8H	363	RESEARCH AND DEVELOPMENT LABORATORY BUILDING
ROCKWELL	7G	373	DEVELOPMENT TEST BUILDING
GOVT.	7G	374	TEST LOOP ENCLOSURE
ROCKWELL	8G	375	CONTROL SHELTER BUILDING
GOVT.	7F	383	LMCC CONSTRUCTION STAGING
ROCKWELL	4D	453	STG. NEUTRON RADIOGRAPHY STORAGE
GOVT.	7D	457	PUMP BEARING TEST STRUCTURE
GOVT.	8D	456	UNINTERRUPTIBLE POWER SUPPLY
GOVT.	8F	447	SODIUM PUMP TEST FACILITY
GOVT.	8F	463	SODIUM CLEANING AND HANDLING FACILITY
ROCKWELL	8G	473	HYDRAULIC TEST INSTRUMENTATION BUILDING
GOVT.	8D	478	SUPPORT TRAILER (LMCC)
GOVT.	7F	482	GOVERNMENT PROJECT OFFICE
GOVT.	7F	483	LMCC OFFICE COMPLEX
GOVT.	7F	484	REST ROOM - TRAILER
GOVT.	7F	485	LMCC OFFICE COMPLEX
GOVT.	7F	486	LMCC OFFICE COMPLEX
ROCKWELL	8F	500	COMPRESSED GAS BOTTLE STORAGE DOCK
ROCKWELL	5E	501	PARKING LOT
ROCKWELL	7E	502	PARKING LOT
ROCKWELL	6D	506	PARKING LOT
ROCKWELL	9G	509	PARKING LOT
ROCKWELL	2B	511	PARKING LOT
GOVT.	3C	513	PARKING LOT
ROCKWELL	8G	520	PARKING LOT
ROCKWELL	5C	523	PARKING LOT
GOVT.	4C	535	PARKING LOT
ROCKWELL	6D	536	PARKING LOT
GOVT.	8F	538	PARKING LOT
ROCKWELL	3C	540	PARKING LOT
ROCKWELL	2B	583	PARKING LOT
ROCKWELL	5F	600	CONSERVATION STORAGE YARD
ROCKWELL	6E	608	SEWAGE TREATMENT PLANT
ROCKWELL	8E	611	HYDROGEN RECOMBINER TEST
ROCKWELL	6F	612	PAINT SPRAY BOOTH
GOVT.	7C	614	STORAGE BUILDING
ROCKWELL	6E	616	DRAINAGE SUMP
GOVT.	6E	621	COOLING TOWER
GOVT.	6C	623	RADIOACTIVE ACCOUNTABLE WASTE STORAGE BUILDING
GOVT.	5C	622	RADIOACTIVE WASTE COUNTING BUILDING
ROCKWELL	2B	627	GUARD POST NO. 1
GOVT.	8E	626	LMCC INVENTORY STORAGE
ROCKWELL	4C	633	REACTOR COOLING WATER PAD
GOVT.	5D	636	GUARD POST
GOVT.	4C	641	RECEIVING & STORAGE BUILDING
GOVT.	5B	653	LIQUID RADIOACTIVE WASTE VAULT - D&D
GOVT.	5C	654	INTERIM RADIOACTIVE WASTE - D&D
GOVT.	7E	656	SCIT COOLING TOWER
GOVT.	6C	664	LOW LEVEL RADIOACTIVE WASTE PROCESSING
GOVT.	6C	665	RMDS OXIDATION FACILITY
GOVT.	4C	683	ELECTRICAL SUB-STATION
GOVT.	5B	686	TEMPORARY HOT WASTE STORAGE - D&D
GOVT.	6C	688	AUXILIARY SKID BUILDING
GOVT.	4C	693	ELECTRICAL SUB-STATION NO. 1
GOVT.	8B	695	COLD TRAP VAULT (SRE) - D&D
ROCKWELL	10J	701	WATER TANK (DEER FLATS)
ROCKWELL	10J	702	WATER TANK (DEER FLATS)
GOVT.	6E	704	ELECTRICAL SUBSTATION
ROCKWELL	6E	705	ELECTRICAL SUBSTATION
ROCKWELL	6E	706	ELECTRICAL SUBSTATION
ROCKWELL	9G	709	ELECTRICAL SUBSTATION
ROCKWELL	6F	711	ELECTRICAL SUBSTATION
GOVT.	7D	713	ELECTRICAL SUBSTATION
GOVT.	7D	719	ELECTRICAL SUBSTATION
ROCKWELL	8G	720	ELECTRICAL SUBSTATION
GOVT.	4B	724	CONTAMINATED SODIUM CLEANING BUILDING
GOVT.	7D	726	ELECTRICAL SUB-STATION
GOVT.	5U	727	ELECTRICAL SUB-STATION
ROCKWELL	10G	730	STORAGE SHED
GOVT.	5D	742	ELECTRICAL SUBSTATION
GOVT.	5B	753	PRIMARY FILL TANK VAULT - D&D
ROCKWELL	8G	755	ELECTRICAL SUBSTATION
GOVT.	7D	756	ELECTRICAL SUBSTATION
GOVT.	8E	767	ELECTRICAL SUBSTATION
GOVT.	8D	758	ELECTRICAL SUBSTATION
GOVT.	7F	762	ELECTRICAL SUBSTATION
GOVT.	3C	763	ELECTRICAL SUBSTATION
GOVT.	4B	773	DRAINAGE CONTROL DAM
GOVT.	8F	780	ELECTRICAL SUBSTATION
SCC	3C	783	ELECTRICAL SUBSTATION
GOVT.	5C	783	ELECTRICAL SUBSTATION
ROCKWELL	9F	800	ELECTRICAL SUB-STATION
ROCKWELL	7E	806	TIME CLOCK BUILDING
ROCKWELL	11G	814	LARGE LEAK INJECTOR DEVICE
ROCKWELL	8E	816	RECOMBINER CANOPY
ROCKWELL	8D	836	TIME CLOCK BUILDING
GOVT.	7H	854	TEST STRUCTURE
ROCKWELL	7H	863	HYDRAULIC TEST LOOP
ROCKWELL	8D	873	HYDRAULIC TEST LABORATORY
ROCKWELL	7F	883	ELECTRICAL SUB-STATION

AI-76-21  
A-I-13

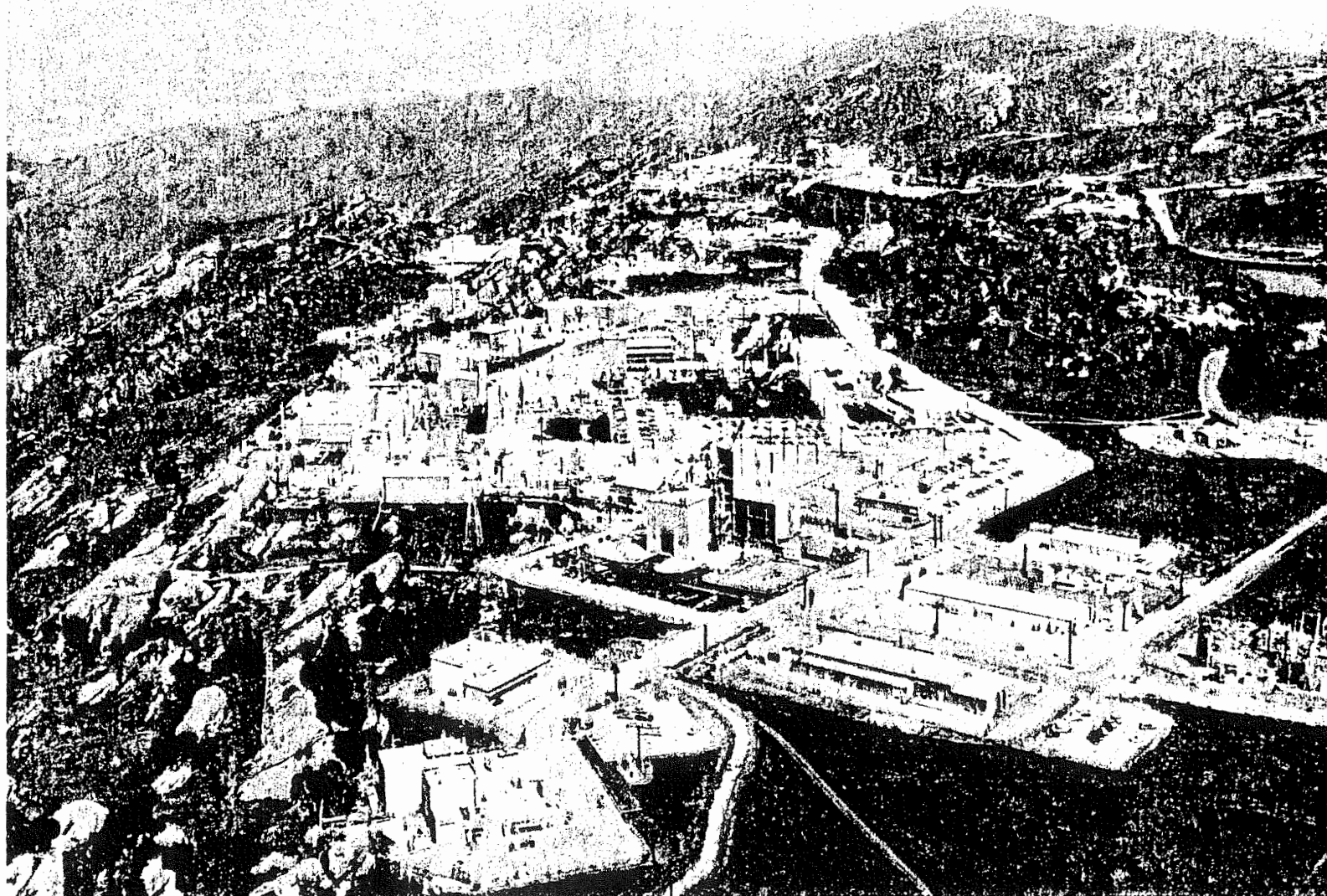


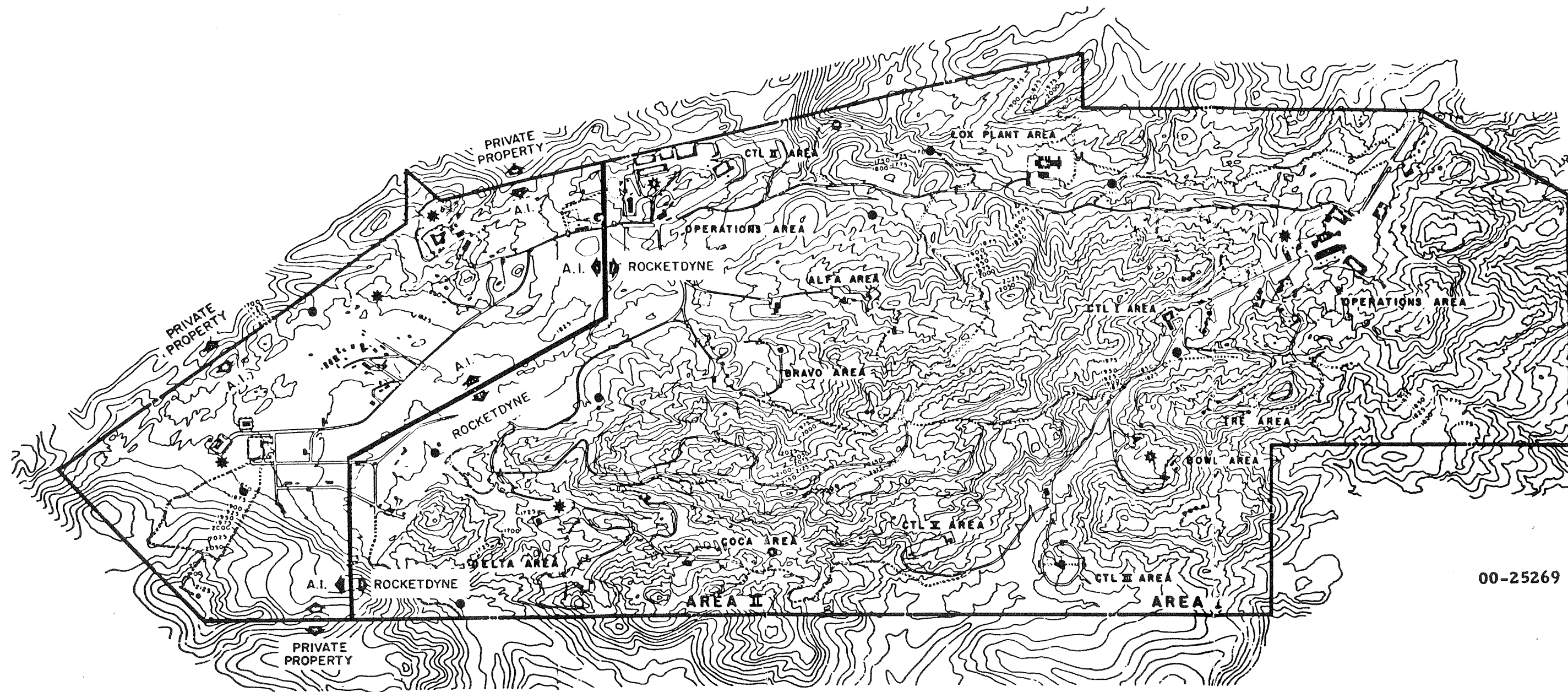
Figure A-I-6. Aerial View of NDFL Site

SS-337CN

## II. TOPOGRAPHY

The Headquarters site located in the San Fernando Valley is level, typical of most of the valley floor.

The NDFL site is situated in rugged terrain typical of mountain areas of recent geological age. The site may be described as an irregular plateau sprinkled with outcroppings above the more level patches and with peripheral eroded gullies. Elevations of the site vary from 1650 to 2250 ft above sea level. The surface mantle consists of sand and clay soil on sandstone. Figure A-II-1 is a topographic map of the NDFL area.



00-25269

0 1/4 1/2 MILE

0 600 1200 1800 2400 FEET  
GRAPHIC SCALES

- LEGEND**
- STRUCTURES
  - WATER TANK
  - WATER WELL
  - ROADS
  - TOPOGRAPHY
  - ★ WEATHER INSTRUMENTATION

Figure A-II-1.  
Topographic Map of NDFL

AI-76-21  
A-II-3

### III. LAND USE

The land surrounding the Headquarters site is utilized only for small commercial establishments and for single and multiple family occupancy dwellings. In the San Fernando Valley, there are scattered truck farms. Those within 5 miles are generally less than 40 acres and are principally used for growing sweet corn during the summer months. There is a single large acreage used for seasonal truck farming a little over 6 miles SE in the Sepulveda Dam Basin.

The terrain surrounding the NDFL is generally too rocky and rugged for other than an occasional dwelling. The closest dwelling to the NMDF (Bldg. 055) on the NDFL site is about 1-1/4 miles. There are scattered seasonal truck farming enterprises in the Simi Valley, ~3 miles to the north, and in the Thousand Oaks area, ~9 miles SW of the site (see Figure A-I-2), and those areas previously mentioned in the San Fernando area.

There are bodies of water in the surrounding areas (see Figures A-I-1 and A-I-2), none closer than 8 miles to either site. These are mainly used for recreation, irrigation and flood control. The Van Norman Reservoir and Encino Reservoir [8 miles ENE and 8 miles SE respectively from the Headquarters site] are used as supplemental city water supplies.

#### IV. HYDROLOGY

Water used at the Headquarters site is obtained from the Los Angeles city water mains and discharged to the Los Angeles city sewer system unless hold-up and alternate disposal are necessary for radiological or environmental controls. Surface water drains to the adjoining city streets, then to the city storm drainage system and finally, to the flood control system of the city and county of Los Angeles.

Surface water at the NDFL site is derived from three sources: (1) rainfall annually averages about 17 in., (2) industrial waste water, and (3) rocket engine exhaust coolant. Reclamation and catch ponds impound this water on a normal basis for reuse. The surface drainage pattern at the site is generally towards the San Fernando Valley. For the most part, the reclamation and catch ponds are situated in this general drainage pattern, and normally any overflow drainage from this catch basin system is directed through two channels leading southeasterly to Bell Canyon Creek. At a point west of Canoga Park this creek joins the Los Angeles River Channel which in turn flows east into the Sepulveda Flood Control Basin. However, under worst storm conditions, overflow drainage from two of the catch ponds could flow west into the Simi Valley through a system of normally dry creek beds.

The Chico formation underlying most of the NDFL site is composed of undifferentiated cretaceous sandstone beds which are generally medium to coarse-grained, massive, well-cemented and occasionally interbedded with thin shales.

Because of the geology of the formation and its low permeability, the ground water systems of Simi Valley and the San Fernando Valley are separate. Moreover, in contrast to the surface drainage, the vadose water introduced from the site very slowly percolates through the formation and can eventually combine with the ground-water system for Simi Valley. However, the quantity of liquid effluents discharged at the Rockwell International Field Test Laboratory is too small to produce any significant subsurface flow into Simi Valley.

Sources of potable water nearest the plant include the Chatsworth Reservoir, ~1-1/2 miles west of the Headquarters site and ~3 miles east of the NDFL. This reservoir is currently drained and the future plans for this facility are not currently known. The next nearest reservoirs are the Van Norman Reservoir (~8 miles ENE from Headquarters site) and the Encino Reservoir (8 miles SE from Headquarters site) which are identifiable on Figure A-I-2.

## V. GEOLOGY

Underlying the NDFL site are undifferentiated formations of Upper Cretaceous age, marine sandstone, some conglomerate and shale. Surface strata 20 to 30 ft thick have numerous fractures, particularly in the areas with numerous faults. The NDFL is composed of alluvial deposits from 10- to 30-ft depths. The Headquarters site in the San Fernando Valley is underlain by alluvial deposits of clay, sand and gravels several hundreds of feet thick.

Several minor faults are associated with the general area of the NDFL site. One minor fault passes diagonally through the field laboratory area at the west end of Burro Flats.<sup>(1)</sup> This fault, known as the Simi Fault, was identified in 1937. Other numerous old fractures in rhombic patterns, as might be expected to result from the formation of these mountains, have been recorded.

No faults have been identified in the immediate vicinity of the Headquarters site.<sup>(1)</sup>

California,\* which is a part of the Pacific seismic belt, accounts for most of the seismicity of the contiguous United States. This region contains a number of active faults: San Andreas Fault, the dominant fault in California, about 40 miles northeast of the sites; Santa Ynez Fault, 35 miles north; San Gabriel, 30 miles north; Inglewood Fault, recently active in the Long Beach area, about 30 miles southeast. Seismic history of the immediate area of the site cannot be accurately presented because of the lack of eyewitness accounts in such a relatively uninhabited area. However, the seismic history of the general Southern California area is more readily available. No earthquakes are known to have originated in the immediate area of the sites. Richter<sup>(5)</sup> locates three or four minor earthquakes of magnitude 3 to 3.5, perhaps located on the San Gabriel and the Oak Ridge Faults, each approximately 15 miles from the sites. The February 9, 1971, San Fernando Earthquake was a 6.6 magnitude earthquake.<sup>(6)</sup> The epicenter near the San Gabriel Fault was in the Newhall-Sylmar area about 14 miles northeast of the Canoga Park Facility and 20 miles east-northeast of the NDFL. Earthquakes of greater magnitude have been recorded

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\*Extensive use of References 1 through 9 have been made for the seismological information presented.

but at greater distances from the sites. The Long Beach earthquake of 1933 was centered over 40 miles away on the Inglewood Fault. A similar 6.3 magnitude quake at Santa Barbara in 1925 was located nearly 60 miles from the site. In 1916 a magnitude 6 earthquake occurred on the San Andreas Fault at a distance of ~45 miles. In 1857 a strong quake believed to be of magnitude 7.7 also occurred in the Tejon Pass area over 45 miles away. This earthquake and the more recent magnitude 7.7 Tehachapi quake on the White Wolf Fault over 50 miles away are the strongest earthquakes recorded in Southern California. While it is not possible to accurately predict what magnitude earthquake may occur at any given location, some qualitative statements may be made. Historically, strong earthquakes of magnitude 6 or greater have always been associated with major fault systems. The minor faulting in the area of the sites should therefore experience a considerably smaller magnitude. Also, since these fault systems are not known to be recently active, a magnitude of 5 to 6 would probably be conservative for an earthquake generated in the area of the site.

## VI. CLIMATOLOGY AND METEOROLOGY

### A. CLIMATOLOGY DESCRIPTION

The general local area and site-specific climatology for the Headquarters and NDFL sites are discussed in the following sections.

#### 1. General Climatology

The Los Angeles basin is a semi-arid region, controlled principally by the semi-permanent Pacific high pressure cell. The seasonal changes in the position of this cell influence the weather conditions strongly. Associated with this cell, there is an inversion tilting downward from Hawaii to the California coastline. During summer, the high is displaced to the north and causes clear skies with little precipitation. In winter, the high shifts southward sufficiently to allow some Pacific lows to move frontal activity into the area, with light to moderate precipitation and with northerly and northwesterly winds.

Rocketdyne Division of Rockwell International Corporation operates two stations providing wind speed and direction data. In addition, there are similar instruments at Building 3 at the Headquarters complex.

The summer displacement of the Pacific high pressure cell to the north results in Southern California being under the influence of a subsidence inversion practically every day during the summer. The injection of marine surface air under this inversion results in fog along the coastal sections, common for this season. Occasionally during this season, the minor perturbations in the placement of the Pacific high and the thermal low associated with the desert areas to the east cause an increase in both the flow and depth of marine surface air which extends the fog well into the inland valleys.

Generally, under this subsidence inversion condition the NDFL site is above the base of the inversion in elevation most of the year, resulting in lofting meteorological conditions. During the winter season, frontal systems moving into the area or high pressure systems to the northeast in the Great Basin area cause moderate to strong northerly winds throughout Southern California.

## 2. Microclimatology

During the summer months, the microclimatology of the area is determined largely by the effects of the subsidence inversion and diurnal heating. Precipitation during this season is rare, and the wind patterns resulting are primarily those associated with diurnal heating. The up-valley, up-slope winds along the southern exposures of the hills surrounding the San Fernando Valley result in light southeasterly winds at both sites during the morning, with the flow from the San Fernando Valley over the hills into the surrounding valleys. In the afternoon, this flow reverses due to heating of the reverse slopes of the hills, resulting in westerly winds. Modified marine air is introduced into both the Simi and San Fernando Valleys during the afternoon wind regime as the Simi Valley, through interconnecting valleys, is afforded access to the onshore flow of marine air. This results in temperature differences of 6 to 10 degrees between the two valleys, the Simi Valley being the cooler. The winds during the afternoon are somewhat stronger from the west, the flow being aided by the air pressure gradients from the west. The air flow over the Simi Hills into the San Fernando Valley causes adiabatic cooling and then heating and mixing as it descends toward the other valley, the slightly cooler air from Simi Valley remaining aloft over the warmer air in the San Fernando Valley.

During the evening hours, diurnal cooling results in down-canyon, down-valley winds. The adiabatic warming of the descending mixed air results in a fairly strong temperature discontinuity over the cooler marine air pool in the Simi Valley. The depth of the marine layer averages 150 ft. In the San Fernando Valley the wind pattern becomes downslope after the westerly flow has stopped in the evening, and diurnal cooling occurs. However, the descending cooler air does not encounter a pool of marine air, and the lapse rate in the valley becomes neutral to a slight inversion condition. During periods of increased onshore flow of marine air, the entire zone under the subsidence inversion is occupied by marine air as previously described in the general climatology section.

In the winter season the Pacific high cell shifts to the south and the subsidence inversion for the most part is missing. The surface air flow is dominated by frontal activity moving through the area or to the east. The surface

air source is generally from the east and the predominant feature is the Santa Ana wind conditions caused by high pressure systems moving into the Great Basin area. During these periods of high pressure in the Great Basin area, the northerly winds are moderate to strong over all of Southern California. Such a flow destroys the marine air flow and the entire area is under the influence of dry continental air. The lapse rate is dry adiabatic, and turbulent mixing conditions are caused by the winds. Frontal activity moving into the area brings precipitation from late November through March. The surface wind pattern during the winter, instead of being influenced by diurnal effects and local terrain conditions, is now very strongly dominated by the movement of dynamic pressure systems.

### 3. Effect of Meteorology in Area on Atmospheric Releases

A summary is given below regarding the effects of the microclimatology on possible atmospherical release of pollutants from the NDFL and Headquarters sites.

During the summer season the subsidence inversion is present almost every day. The base and top of this inversion for the most part lie below the NDFL. Thus, any atmospheric release under this condition from the NDFL site would result in lofting diffusion conditions above the inversion and considerable atmospheric dispersion prior to diffusion (if any) through the inversion into the Simi or San Fernando Valleys. If the subsidence inversion is at or above the level of the NDFL site, a release would be made either into or below the inversion layer. Release into the inversion regardless of the wind direction with respect to the two valleys would result in slow vertical diffusion of the material in the inversion layer, thus permitting considerable lateral and downwind diffusion before reaching the inversion base. Upon penetrating the inversion base, the material would then undergo both increased lateral and vertical diffusion typical of slight neutral to lapse conditions under the inversion base. For releases of material from the NDFL just under the base of the subsidence inversion, rapid lateral and downward diffusion would occur, typical of slight neutral to lapse conditions. The wind direction becomes more significant once material reaches the layer under the inversion as to the time the material would reach the nearest off-site population. If the diurnal winds are blowing

from the San Fernando into the Simi Valley, the downward diffusion would be halted when the material reaches the temperature discontinuity associated with the pool of marine air at an approximate height of 150 ft above the Simi Valley. Material diffusion over Simi Valley would then be analogous to the lofting situation previously described. If the wind direction were reversed, blowing from the Simi Valley into the San Fernando Valley, the material would continue to diffuse downward at a somewhat slower rate than characteristic of lapse conditions, due to the mixing of the marine air from Simi Valley with the drier air of the San Fernando Valley. As discussed in the previous subsection, the establishment of a marine air pool in the San Fernando Valley only occurs in the case of full scale layer displacement.

Release at the Headquarters site for these summer season conditions would be under the subsidence inversion into an atmosphere typical of slight neutral to lapse conditions. Although nocturnal cooling inversions are present they are relatively shallow in extent.

In the event the onshore flow of marine air is increased to the extent that the entire layer below the subsidence inversion is replaced by this marine air, advective fog conditions associated with this season would result in both of the valleys. The diffusion characteristics for this type of atmosphere would be slight neutral to moist adiabatic lapse. During the winter season, the micro-meteorology of the site is dominated by dynamic pressure systems moving into the local area or the Great Basin area to the northeast. For most of the winter season, Santa Ana wind conditions caused by centers of high pressure systems moving through, or stagnating within, the Great Basin area of Nevada and Utah result in pressure gradients and air flow through valleys into the coastal areas of Southern California. The wind conditions in the two valleys during these periods are moderate to strong from the north to northeast. The diffusion characteristics associated with this type of weather regime are dry adiabatic lapse conditions with extremely turbulent mixing due to the strong winds.

Frontal passages through the area during this season are generally accompanied by precipitation. Diffusion characteristics are highly variable depending

upon the frontal location. Generally, a light to moderate southwesterly wind precedes these frontal passages introducing strong onshore flow of marine air, and lapse rates are slight neutral to lapse. Wind speeds increase with the approach of the frontal systems, enhancing diffusion. The diffusion characteristics of the frontal passage are lapse conditions with light to moderate northerly winds.

#### B. CLIMATOLOGICAL AND METEOROLOGICAL DATA

The climatology of the sites is typical of a semi-arid region. The weather patterns are controlled principally by the position of the semi-permanent Pacific high pressure cell located off the west coast of North America. The annual mean rainfall is 17.4 in. with 95% of the total falling between November and April. About 30 days of the year temperatures exceed 90°F with an annual maximum of 102°F. About three days of the year the temperature falls below 32°F; the annual minimum is about 29°F. Generally the NDFL experiences a somewhat higher minimum and lower summer maximum than is recorded at the nearest U.S. Weather Bureau Station in Burbank, on the San Fernando Valley floor. Tables A-VI-1 through A-VI-4 present more detailed information concerning site climatology. As a result of the climate, there are no all-season rivers or streams in the valley, and precipitation run-off is controlled through the use of storm drains and channels.

TABLE A-VI-1  
SURFACE WIND CONDITIONS

	Summer	Winter
Prevailing afternoon direction	WNW	NW
Prevailing early morning direction	ESE	ESE
Average daytime speed	8 mph	6 mph
Average nighttime speed	3 mph	3 mph

TABLE A-VI-2  
UPPER WIND CONDITIONS NEAR SITE

	Summer			Winter		
	3,250	9,750	16,500	3,250	9,750	16,500
Elevation (ft)						
Prevailing direction	SSE	SW	SW	N	NW	NNW
Average speed in pre-vailing direction (mph)	5	12	15	5	15	20

TABLE A-VI-3  
MEANS AND EXTREMES IN PRECIPITATION  
(in.)

	Mean	50-yr Heaviest Probability
Annual	17.4	40
Summer (May-Oct)	1.0	7
Winter (Nov-Apr)	15.7	38
Most Rain (monthly)	3.7 Nov	20
Most Rain (daily)	—	8.5

TABLE A-VI-4  
CLOUD COVER

Month	Number of Days Per Month		
	Clear	Partly Cloudy	Cloudy
January	15	8	8
March	14	9	8
May	13	11	7
July	25	5	1
September	22	7	1
November	19	8	3

## VII. DEMOGRAPHY

The population distributions around the NDFL and the AI Headquarters site are presented in this section based on the 1970 census data and are projected into the future by decade for four decades. The projections were based on an average growth rate of 5.17%/yr for this area.\* The population distribution surrounding the NDFL out to five miles is presented in Tables A-VII-1 thru -5. The accompanying sector map for this population distribution is presented in Figure A-VII-1. The population distribution surrounding the AI Headquarters site out to five miles is presented in Tables A-VII-6 thru -10. The accompanying sector map for this population distribution is presented in Figure A-VII-2. For population distribution at distances greater than five miles out to 50 miles, a single distribution centered on 34°14'25" north and 118°39'00" west is presented.† This location is between the AI NDFL and Headquarters site which are ~6 miles apart. The population distribution is again based on the 1970 census data, and the projection for the next four decades is based on the same average growth rate of 5.17 %/year. These data are presented in Tables A-VII-11 thru -15. The accompanying sector map for the population distribution is presented in Figure A-VII-3.

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\*Growth rates for this area are reported<sup>(10)</sup> to range from 1.36 to 9.17%/yr. The average is 5.17 %/yr.

†AI wishes to thank the Argonne National Laboratory for the 1970 census distribution centered on this location.

TABLE A-VII-1  
POPULATION DISTRIBUTION SURROUNDING NDFL  
(1970 Census)

Sector	Distance (miles)						Total
	0-1/2	1/2-1	1-2	2-3	3-4	4-5	
N-NNE	0	0	0	2,954	4,738	3,720	11,403
NNE-NE	0	0	0	966	3,336	0	4,302
NE-ENE	0	0	0	0	1,937	1,254	3,191
ENE-E	0	0	0	0	5	396	401
E-ESE	0	0	0	0	0	2,335	2,335
ESE-SE	0	0	0	12	12	5,968	5,992
SE-SSE	0	0	0	23	5	1,020	1,048
SSE-S	0	0	0	0	0	0	0
S-SSW	0	0	0	0	0	0	0
SSW-SW	0	0	0	0	0	0	0
SW-WSW	0	0	0	0	0	0	0
WSW-W	0	0	0	0	0	0	0
W-WNW	0	0	0	0	0	0	0
WNW-NW	0	0	0	0	0	0	0
NW-NNW	0	0	0	0	0	0	0
NNW-N	0	0	0	0	0	0	0
Total	0	0	0	3,955	10,033	14,693	

TABLE A-VII-2  
POPULATION DISTRIBUTION SURROUNDING NDFL  
(1980 Projection)

Sector	Distance (miles)						
	0-1/2	1/2-1	1-2	2-3	3-4	4-5	Total
N-NNE	0	0	0	4,890	7,843	6,158	18,877
NNE-NE	0	0	0	1,599	5,522	0	7,122
NE-ENE	0	0	0	0	3,207	2,076	5,282
ENE-E	0	0	0	0	8	656	664
E-ESE	0	0	0	0	0	3,865	3,865
ESE-SE	0	0	0	20	20	9,879	9,919
SE-SSE	0	0	0	38	8	1,689	1,735
SSE-S	0	0	0	0	0	0	0
S-SSW	0	0	0	0	0	0	0
SSW-SW	0	0	0	0	0	0	0
SW-WSW	0	0	0	0	0	0	0
WSW-W	0	0	0	0	0	0	0
W-WNW	0	0	0	0	0	0	0
WNW-NW	0	0	0	0	0	0	0
NW-NNW	0	0	0	0	0	0	0
NNW-N	0	0	0	0	0	0	0
Total	0	0	0	6,547	16,609	24,323	

## VI. CLIMATOLOGY AND METEOROLOGY

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upon the frontal location. Generally, a light to moderate southwesterly wind precedes these frontal passages introducing strong onshore flow of marine air, and lapse rates are slight neutral to lapse. Wind speeds increase with the approach of the frontal systems, enhancing diffusion. The diffusion characteristics of the frontal passage are lapse conditions with light to moderate northerly winds.

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\*Growth rates for this area are reported<sup>(10)</sup> to range from 1.36 to 9.17%/yr. The average is 5.17 %/yr.

†AI wishes to thank the Argonne National Laboratory for the 1970 census distribution centered on this location.

TABLE A-VII-2  
POPULATION DISTRIBUTION SURROUNDING NDFL  
(1980 Projection)

Sector	Distance (miles)						
	0-1/2	1/2-1	1-2	2-3	3-4	4-5	Total
N-NNE	0	0	0	4,890	7,843	6,158	18,877
NNE-NE	0	0	0	1,599	5,522	0	7,122
NE-ENE	0	0	0	0	3,207	2,076	5,282
ENE-E	0	0	0	0	8	656	664
E-ESE	0	0	0	0	0	3,865	3,865
ESE-SE	0	0	0	20	20	9,879	9,919
SE-SSE	0	0	0	38	8	1,689	1,735
SSE-S	0	0	0	0	0	0	0
S-SSW	0	0	0	0	0	0	0
SSW-SW	0	0	0	0	0	0	0
SW-WSW	0	0	0	0	0	0	0
WSW-W	0	0	0	0	0	0	0
W-WNW	0	0	0	0	0	0	0
WNW-NW	0	0	0	0	0	0	0
NW-NNW	0	0	0	0	0	0	0
NNW-N	0	0	0	0	0	0	0
Total	0	0	0	6,547	16,609	24,323	

TABLE A-VII-3  
POPULATION DISTRIBUTION SURROUNDING NDFL  
(1990 Projection)

Sector	Distance (miles)						Total
	0-1/2	1/2-1	1-2	2-3	3-4	4-5	
N-NNE	0	0	0	8,095	12,984	10,195	31,250
NNE-NE	0	0	0	2,647	9,142	0	11,790
NE-ENE	0	0	0	0	5,308	3,437	8,745
ENE-E	0	0	0	0	14	1,085	1,099
E-ESE	0	0	0	0	0	6,399	6,399
ESE-SE	0	0	0	33	33	16,355	16,421
SE-SSE	0	0	0	63	14	2,795	2,872
SSE-S	0	0	0	0	0	0	0
S-SSW	0	0	0	0	0	0	0
SSW-SW	0	0	0	0	0	0	0
SW-WSW	0	0	0	0	0	0	0
WSW-W	0	0	0	0	0	0	0
W-WNW	0	0	0	0	0	0	0
WNW-NW	0	0	0	0	0	0	0
NW-NNW	0	0	0	0	0	0	0
NNW-N	0	0	0	0	0	0	0
Total	0	0	0	10,839	27,495	40,266	

TABLE A-VII-4  
POPULATION DISTRIBUTION SURROUNDING NDFL  
(2000 Projection)

Sector	Distance (miles)						Total
	0-1/2	1/2-1	1-2	2-3	3-4	4-5	
N-NNE	0	0	0	13,402	21,495	16,877	51,733
NNE-NE	0	0	0	4,383	15,135	0	19,517
NE-ENE	0	0	0	0	8,788	5,689	14,477
ENE-E	0	0	0	0	23	1,797	1,819
E-ESE	0	0	0	0	0	10,593	10,593
ESE-SE	0	0	0	54	54	27,076	27,185
SE-SSE	0	0	0	104	23	4,628	4,755
SSE-S	0	0	0	0	0	0	0
S-SSW	0	0	0	0	0	0	0
SSW-SW	0	0	0	0	0	0	0
SW-WSW	0	0	0	0	0	0	0
WSW-W	0	0	0	0	0	0	0
W-WNW	0	0	0	0	0	0	0
WNW-NW	0	0	0	0	0	0	0
NW-NNW	0	0	0	0	0	0	0
NNW-N	0	0	0	0	0	0	0
Total	0	0	0	17,943	45,518	66,659	

AI-76-21  
A-VII-5

TABLE A-VII-5  
POPULATION DISTRIBUTION SURROUNDING NDFL  
(2010 Projection)

Sector	Distance (miles)						Total
	0-1/2	1/2-1	1-2	2-3	3-4	4-5	
N-NNE	0	0	0	22,186	35,585	27,939	85,644
NNE-NE	0	0	0	7,255	25,055	0	32,311
NE-ENE	0	0	0	0	14,548	9,418	23,966
ENE-E	0	0	0	0	38	2,974	3,012
E-ESE	0	0	0	0	0	17,537	17,537
ESE-SE	0	0	0	90	90	44,823	45,004
SE-SSE	0	0	0	173	38	7,661	7,871
SSE-S	0	0	0	0	0	0	0
S-SSW	0	0	0	0	0	0	0
SSW-SW	0	0	0	0	0	0	0
SW-WSW	0	0	0	0	0	0	0
WSW-W	0	0	0	0	0	0	0
W-WNW	0	0	0	0	0	0	0
WNW-NW	0	0	0	0	0	0	0
NW-NNW	0	0	0	0	0	0	0
NNW-N	0	0	0	0	0	0	0
Total	0	0	0	29,704	75,354	110,353	

AI-76-21  
A-VII-6



TABLE A-VII-6  
POPULATION DISTRIBUTION SURROUNDING AI HEADQUARTERS FACILITY  
(1970 Census)

Sector	Distance (miles)						Total
	0-1/2	1/2-1	1-2	2-3	3-4	4-5	
N-NNE	210	502	2,157	702	0	0	3,571
NNE-NE	205	502	2,238	2,273	2,990	1,573	9,781
NE-ENE	202	502	2,051	3,736	6,608	8,082	21,181
ENE-E	236	599	1,411	4,940	3,823	6,365	17,374
E-ESE	236	607	2,397	8,348	10,612	12,982	22,200
ESE-SE	236	712	4,219	4,919	11,071	13,419	21,157
SE-SSE	236	712	3,102	7,021	10,747	9,932	31,750
SSE-S	237	712	3,856	8,162	3,945	6,365	23,277
S-SSW	236	742	4,917	6,946	3,472	8,866	25,179
SSW-SW	236	929	3,085	6,262	7,757	11,598	29,867
SW-WSW	193	1,580	3,595	6,144	4,038	7,540	23,090
WSW-W	318	1,369	2,633	151	754	0	5,225
W-WNW	328	324	234	227	227	0	1,340
WNW-NW	239	113	662	299	38	0	1,351
NW-NNW	230	246	1,364	1,540	102	0	3,482
NNW-N	<u>107</u>	<u>501</u>	<u>1,898</u>	<u>1,322</u>	<u>102</u>	<u>77</u>	4,007
Total	3,685	10,652	39,819	62,992	66,286	86,799	

AI-76-21  
A-VII-8

TABLE A-VII-7

POPULATION DISTRIBUTION SURROUNDING AI HEADQUARTERS FACILITY  
(1980 Projection)

Sector	Distance (miles)						Total
	0-1/2	1/2-1	1-2	2-3	3-4	4-5	
N-NNE	347	831	3,571	1,162	0	0	5,911
NNE-NE	339	831	3,705	3,763	4,950	2,603	16,191
NE-ENE	334	831	3,395	6,185	10,939	13,379	35,063
ENE-E	391	992	2,336	8,178	6,329	10,537	28,761
E-ESE	391	1,005	3,967	13,819	17,567	21,490	36,750
ESE-SE	391	1,179	6,984	8,143	18,327	22,214	35,023
SE-SSE	391	1,179	5,135	11,623	17,791	16,441	52,559
SSE-S	392	1,179	6,383	13,511	6,530	14,677	28,533
S-SSW	391	1,228	8,140	11,498	5,748	19,199	41,681
SSW-SW	391	1,538	5,107	10,366	12,841	12,482	49,442
SW-WSW	319	2,616	5,951	10,171	6,685	0	38,223
WSW-W	526	2,266	4,359	250	1,248	0	8,649
W-WNW	543	536	387	376	376	0	2,218
WNW-NW	396	187	1,096	495	63	0	2,236
NW-NNW	381	407	2,258	2,549	169	0	5,764
NNW-N	<u>177</u>	<u>829</u>	<u>3,142</u>	<u>2,188</u>	<u>169</u>	<u>127</u>	<u>6,633</u>
Total	6,100	17,633	65,916	104,277	109,730	143,687	

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A-VII-9

TABLE A-VII-8  
POPULATION DISTRIBUTION SURROUNDING AI HEADQUARTERS FACILITY  
(1990 PROJECTION)

Sector	Distance (miles)						
	0-1/2	1/2-1	1-2	2-3	3-4	4-5	Total
N-NNE	575	1,376	5,911	1,923	0	0	9,786
NNE-NE	562	1,376	6,133	6,229	8,194	4,311	26,805
NE-ENE	554	1,376	5,621	10,238	18,109	22,149	58,047
ENE-E	647	1,642	3,867	13,538	10,477	17,443	47,613
E-ESE	647	1,663	6,569	22,878	29,082	35,577	60,839
ESE-SE	647	1,951	11,562	13,481	30,340	36,775	57,981
SE-SSE	647	1,951	8,501	19,241	29,452	27,219	87,011
SSE-S	649	1,951	10,567	22,368	10,811	17,443	63,791
S-SSW	647	2,033	13,475	19,063	9,515	24,297	69,003
SSW-SW	647	2,546	8,454	17,161	21,258	31,784	81,851
SW-WSW	529	4,330	9,852	16,838	11,055	20,663	63,278
WSW-W	871	3,752	7,216	414	2,066	0	14,319
W-WNW	899	888	641	622	622	0	3,672
WNW-NW	655	310	1,814	819	104	0	3,702
NW-NNW	630	674	3,738	4,220	280	0	9,542
NNW-N	293	1,373	5,201	3,623	280	0	10,981
Total	10,099	29,192	109,124	172,630	181,657	237,873	

TABLE A- VII-9  
POPULATION DISTRIBUTION SURROUNDING AI HEADQUARTERS FACILITY  
(2000 PROJECTION)

Sector	Distance (miles)						Total
	0- 1/2	1/2-1	1-2	2-3	3-4	4-5	
N-NNE	952	2,272	9,786	3,185	0	0	16,201
NNE-NE	930	2,272	10,153	10,312	13,565	7,136	44,374
NE-ENE	916	2,272	9,305	16,949	29,979	36,666	96,094
ENE-E	1,071	2,717	6,401	22,412	17,344	28,877	78,822
E-ESE	1,071	2,754	10,875	37,873	48,145	58,897	100,717
ESE-SE	1,071	3,230	19,141	22,317	50,227	60,879	95,985
SE-SSE	1,071	3,230	14,073	31,853	48,757	45,059	144,043
SSE-S	1,075	3,230	17,494	37,029	17,898	28,877	105,603
S-SSW	1,071	3,366	22,307	31,513	15,752	40,223	114,232
SSW-SW	1,071	4,215	13,996	28,409	35,192	52,618	135,501
SW-WSW	876	7,168	16,310	27,874	18,320	34,207	104,755
WSW-W	1,443	6,211	11,945	685	3,421	0	23,705
W-WNW	1,488	1,470	1,062	1,029	1,030	0	6,079
WNW-NW	1,084	517	3,003	1,357	172	0	6,129
NW-NNW	1,043	1,116	6,188	6,987	463	0	15,797
NNW-N	485	2,273	8,611	5,998	463	349	18,179
Total	16,718	48,326	180,651	285,782	300,726	393,790	

AI-76-21  
A-VII-11

TABLE A - VII- 10  
POPULATION DISTRIBUTION SURROUNDING AI HEADQUARTERS FACILITY  
(2010 PROJECTION)

Sector	Distance (miles)						Total
	0- 1/2	1/2- 1	1-2	2- 3	3-4	4- 5	
N-NNE	1,577	3,770	16,200	5,272	0	0	26,820
NNE-NE	1,540	3,770	16,809	17,072	22,457	11,814	73,461
NE- ENE	1,517	3,770	15,404	28,060	49,630	60,701	159,082
ENE- E	1,773	4,499	10,597	37,102	28,713	47,805	130,489
E- ESE	1,773	4,559	18,003	62,698	79,702	97,503	166,735
ESE-SE	1,773	5,348	31,687	36,945	83,150	100,785	158,902
SE-SSE	1,773	5,348	23,298	52,732	80,716	74,595	238,462
SSE-S	1,780	5,348	28,961	61,302	29,629	47,805	174,824
S-SSW	1,773	5,573	36,930	52,169	26,077	66,589	189,109
SSW-SW	1,773	6,977	23,170	47,031	58,260	87,108	224,319
SW- WSW	1,450	11,867	27,001	46,145	30,328	56,630	173,420
WSW- W	2,388	10,282	19,775	1,134	5,663	0	39,243
W- WNW	2,463	2,433	1,757	1,705	1,705	0	10,064
WNW-NW	1,795	849	4,972	2,245	285	0	10,147
NW-NNW	1,727	1,848	10,244	11,566	766	0	26,152
NNW-N	804	3,763	14,255	9,929	766	578	30,095
Total	27,677	80,003	299,065	473,108	497,848	651,913	

AI-76-21  
A-VII-12

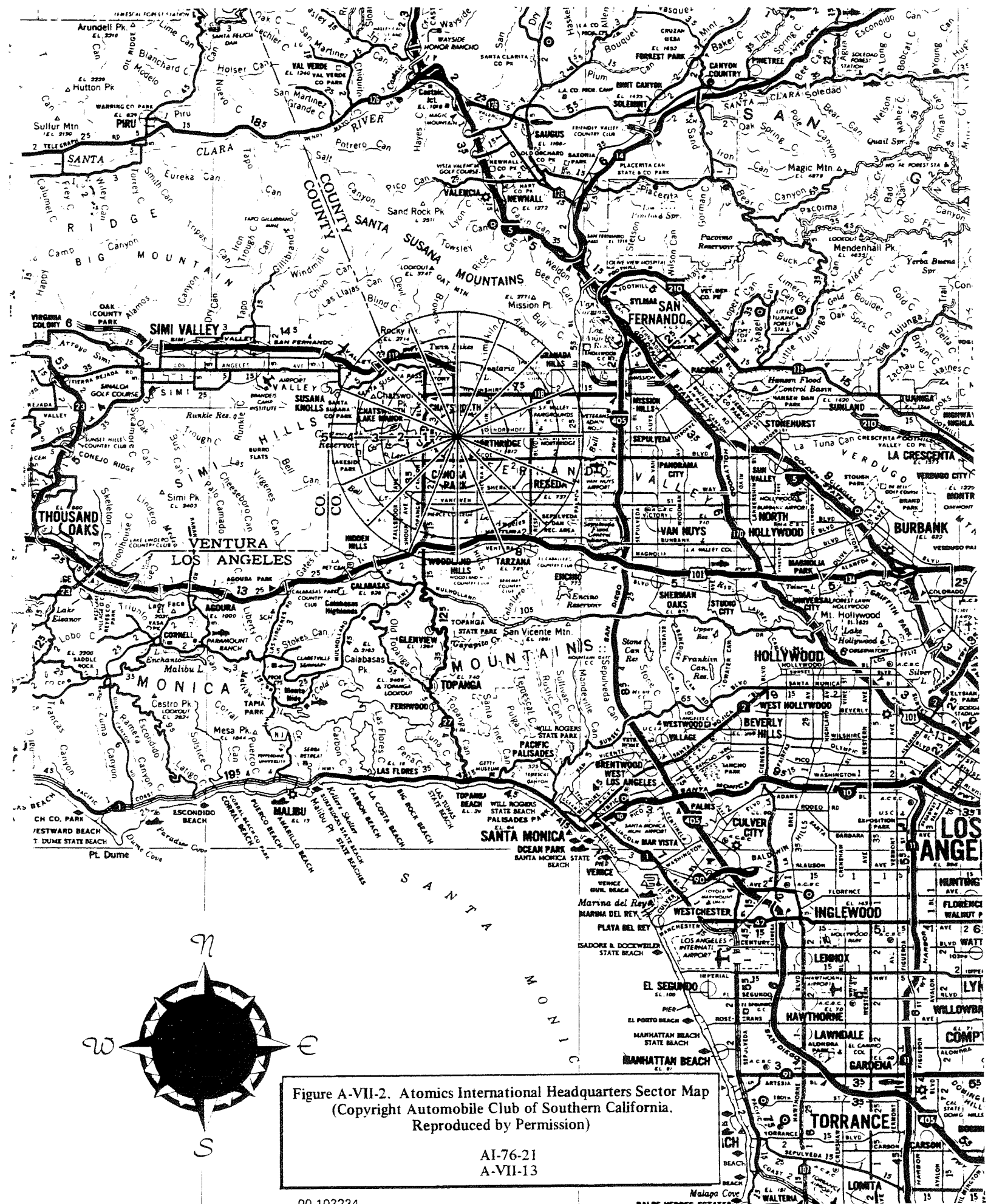


TABLE A-VII-11

POPULATION DISTRIBUTION SURROUNDING AI (1970 CENSUS)  
(118° 39 min 00 sec West and 34° 14 min 25 sec North)

Sector	Distance (miles)						Total
	0-5	5-10	10-20	20-30	30-40	40-50	
N-NNE	200	176	24,294	1,998	2,980	3,193	32,841
NNE-NE	262	200	17,433	2,439	20,648	41,078	82,060
NE-ENE	12,032	43,887	71,540	2,159	854	5,400	135,872
ENE-E	11,779	80,714	224,752	158,842	112,912	88,201	677,200
E-ESE	23,815	91,858	358,315	821,224	796,813	640,462	2,732,487
ESE-SE	27,718	47,041	268,222	1,027,459	995,821	727,594	3,093,855
SE-SSE	24,185	25,145	100,519	117,944	265,020	46,067	579,480
SSE-S	24,016	2,827	5,751	0	200	0	32,794
S-SSW	32	2,135	2,454	0	0	0	4,621
SSW-SW	100	3,037	6,497	0	0	0	9,634
SW-WSW	75	1,119	34,094	14,462	0	0	49,750
WSW-W	628	2,081	17,016	67,396	120,331	415	208,670
W-WNW	3,766	37,348	6,587	22,190	22,058	1,224	93,173
WNW-NW	10,184	3,482	7,528	150	159	100	21,603
NW-NNW	3,839	82	447	75	50	1,549	6,042
NNW-N	200	40	2,327	315	291	31	3,204
Total	142,831	341,172	1,147,766	2,236,658	2,338,537	1,555,314	

AI-76-21  
A-VII-14

TABLE A-VII-12  
POPULATION DISTRIBUTION SURROUNDING AI (1980 PROJECTION)  
(118° 39 min 00 sec West and 34° 14 min 25 sec North)

Sector	Distance (miles)						
	0-5	5-10	10-20	20-30	30-40	40-50	Total
N-NNE	331	291	40,216	3,307	4,933	5,286	54,365
NNE-NE	434	331	28,859	4,038	34,181	68,001	135,842
NE-ENE	19,918	72,651	188,427	3,574	1,414	8,939	224,923
ENE-E	19,499	133,614	372,054	262,947	186,915	146,008	1,121,037
E-ESE	39,423	152,062	593,155	1,359,454	1,319,044	1,060,221	4,523,359
ESE-SE	45,884	77,872	444,015	1,700,856	1,648,482	1,204,459	5,121,568
SE-SSE	40,036	41,625	166,399	195,244	439,376	76,259	959,271
SSE-S	39,756	4,680	9,520	0	331	0	54,287
S-SSW	53	3,534	4,062	0	0	0	7,650
SSW-SW	167	5,027	10,755	0	0	0	15,948
SW-WSW	124	1,852	56,439	12,162	11,778	0	82,356
WSW-W	1,040	3,445	28,168	111,567	199,196	687	345,432
W-WNW	6,234	61,826	10,904	36,733	36,515	2,026	154,239
WNW-NW	16,859	5,764	12,462	248	263	166	35,762
NW-NNW	6,355	136	740	124	83	2,564	10,002
NNW-N	331	66	3,852	521	482	51	5,304
Total	236,442	564,776	1,900,012	3,702,564	3,871,214	2,574,667	

AI-76-21  
A-VII-15

TABLE A-VII-13  
POPULATION DISTRIBUTION SURROUNDING AI  
(118° 39 min 00 sec West 34° 14 min 25 sec North)  
(1990 Projection)

Sector	Distance (miles)						Total
	0-5	5-10	10-20	20-30	30-40	40-50	
N-NNE	548	482	66,578	5,476	8,167	8,750	90,001
NNE-NE	718	548	47,775	6,684	56,586	112,574	224,885
NE-ENE	32,974	120,272	196,055	5,917	2,340	14,799	372,357
ENE-E	32,280	221,197	615,933	435,307	309,435	241,714	1,855,867
E-ESE	65,265	251,737	981,960	2,250,564	2,183,666	1,755,186	7,488,381
ESE-SE	75,961	128,916	735,062	2,815,751	2,729,047	1,993,971	8,478,710
SE-SSE	66,279	68,910	275,472	323,226	727,384	126,247	1,588,065
SSE-S	65,816	7,747	15,761	0	548	0	89,872
S-SSW	88	5,851	6,725	0	0	0	12,664
SSW-SW	274	3,823	17,805	0	0	0	26,402
SW-WSW	206	3,067	93,435	20,134	19,499	0	136,340
WSW-W	1,721	5,703	46,632	184,699	329,767	1,137	571,860
W-WNW	10,321	102,352	18,502	60,812	60,450	3,354	255,341
WNW-NW	27,909	9,542	20,630	411	436	274	59,203
NW-NNW	10,521	225	1,225	206	137	4,245	16,558
NNW-N	548	110	6,377	863	797	85	8,781
Total	391,428	934,982	3,145,452	6,129,561	6,408,761	4,262,338	

AI-76-21  
A-VII-16

TABLE A-VII-14

POPULATION DISTRIBUTION SURROUNDING AI  
(118° 39 min 00 sec West 34° 14 min 25 sec North)  
(2000 Projection)

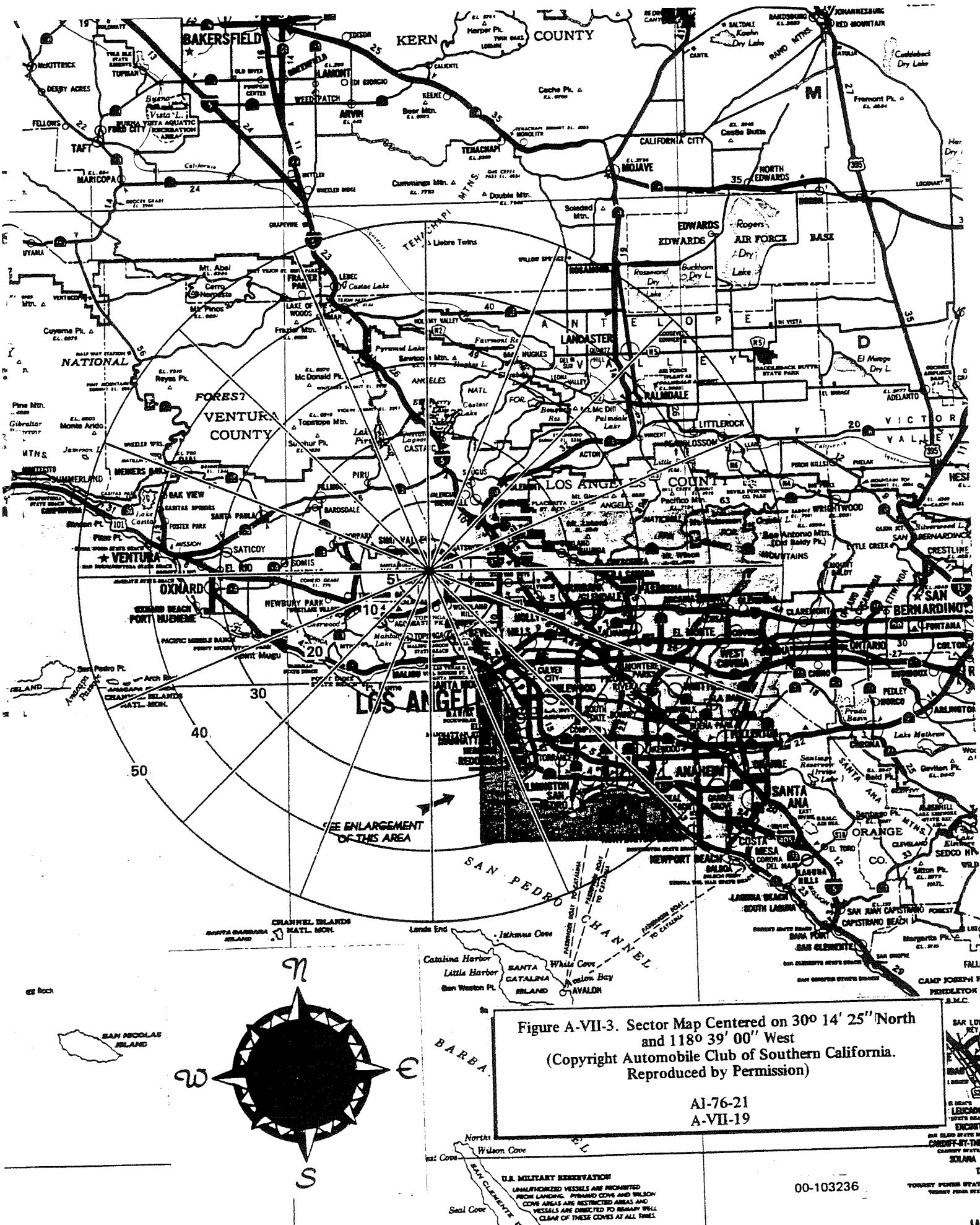
Sector	Distance (miles)						Total
	0-5	5-10	10-20	20-30	30-40	40-50	
N-NNE	907	798	110,217	9,065	13,520	14,486	148,993
NNE-NE	1,189	907	79,090	11,065	93,676	186,363	372,290
NE-ENE	54,587	199,107	324,563	9,795	3,874	24,499	616,424
ENE-E	53,439	366,183	1,019,655	720,634	512,259	400,150	3,072,321
E-ESE	108,044	416,741	1,625,603	3,725,729	3,614,981	2,905,648	12,396,747
ESE-SE	125,751	213,416	1,216,870	4,661,376	4,517,841	3,300,948	14,036,201
SE-SSE	109,723	114,078	456,035	535,088	1,204,157	208,997	2,628,985
SSE-S	108,956	12,826	26,091	0	907	0	148,780
S-SSW	145	9,686	11,133	0	0	0	20,965
SSW-SW	454	13,778	29,476	0	0	0	43,708
SW-WSW	340	5,077	154,678	65,611	0	0	225,706
WSW-W	2,849	9,441	77,198	305,762	545,918	1,883	946,694
W-WNW	17,086	169,440	29,616	100,672	100,073	5,553	422,707
WNW-NW	46,203	15,797	34,153	681	721	454	98,008
NW-NNW	17,417	372	2,028	340	227	7,028	27,411
NNW-N	907	181	10,557	1,429	1,320	1,407	14,536
Total	647,996	1,547,829	5,207,185	10,147,270	10,609,475	7,056,149	

AI-76-21  
A-VII-17

TABLE A-VII-15  
POPULATION DISTRIBUTION SURROUNDING AI  
(118° 39 min 00 sec West, 34° 14 min 25 sec North)  
(2010 Projection)

Sector	Distance (miles)						Total
	0-5	5-10	10-20	20-30	30-40	40-50	
N-NNE	1,502	1,322	182,463	15,006	22,382	23,981	246,656
NNE-NE	1,965	1,502	130,932	18,318	155,079	308,520	616,320
NE-ENE	90,368	329,618	537,308	16,215	6,414	40,557	1,020,480
ENE-E	88,467	606,211	1,688,022	1,192,999	848,037	662,442	5,086,178
E-ESE	178,865	689,909	2,691,161	6,167,885	5,984,544	4,810,254	20,522,617
ESE-SE	208,179	353,306	2,014,508	7,716,834	7,479,213	5,464,667	23,236,707
SE-SSE	181,644	188,854	754,958	885,830	1,993,463	345,991	4,352,242
SSE-S	180,375	21,232	43,193	0	1,502	0	246,303
S-SSW	240	16,035	18,431	0	0	0	34,706
SSW-SW	751	22,810	48,796	0	0	0	72,357
SW-WSW	563	8,404	256,066	108,619	0	0	373,652
WSW-W	4,717	15,630	127,800	506,184	903,758	3,117	1,567,237
W-WNW	28,285	280,506	49,472	166,660	165,669	9,193	699,785
WNW-NW	76,488	26,152	56,540	1,126	1,194	751	162,251
NW-NNW	28,833	616	3,357	563	376	11,634	45,379
NWW-N	1,502	300	17,477	2,366	2,186	233	24,064
Total	1,072,747	2,562,406	8,620,411	16,798,644	17,563,816	11,681,341	

AI-76-21  
A-VII-18



PART A  
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**PART B**

**SPECIFIC INFORMATION**

**AS REQUIRED BY INTERIM GUIDELINES**

## I. IDENTIFICATION OF RADIOLOGICAL AND NONRADIOLOGICAL SOURCES

### A. INTRODUCTION

Identification of the possible radiological and nonradiological sources and the resulting contaminants is provided. Each facility involved with licensable activities is included with a process description summary of the activity or activities underway therein, and the potential contaminants identified that are associated with them.

This information is presented in consideration of Items I and III of the Interim Guidelines for Preparing Environmental Information for Nuclear Facilities.

### B. SUMMARY

Identification of sources of air and water effluents which may contain special nuclear material is limited to the following facilities:

AI/Headquarters, Building 001 – Operations with enriched uranium for fuel element development and production.

Building 004 – Laboratory scale operations with enriched uranium for analytical chemistry of production fuel material.

AI/Nuclear Development Field Laboratory (NDFL), Building 020 – Remote technology operations with nuclear fuels for decladding and examination.

Building 055 – Operations with plutonium and uranium for Advanced Fuels program fuel pin production.

Building 100 – Pending operations with fully encapsulated plutonium and uranium for Advanced Fuels program.

Table B-I-1 presents a brief summary of the activities involved and potential contaminants. The list of potential contaminants provided in this report is based solely on the materials in use in the various operations described and, to some extent, on the nature of the operations themselves.

TABLE B-I-1  
POTENTIAL EFFLUENT CONTAMINANTS - SUMMARY LIST

Building	Location	Activity	Potential Contaminants
001	Hq.	Fuel Element Manufacturing	Uranium, aluminum aerosols, sodium oxide aerosols
004	Hq.	Advanced Nuclear Fuels	Uranium, carbon monoxide
004	Hq.	Analytical Chemistry	Normal reagents, acids, organic solvents - small quantities
020	NDFL	Fuel Decladding and Examination	Uranium and long-lived fission products
055	NDFL	U-Pu Fuel Pin Manufacture	Plutonium and uranium
100	NDFL	Fuel Pin Bonding	Plutonium and uranium

### C. DETAILED DESCRIPTIONS

The following detailed description of each of the facilities summarized here identifies those processes which may generate effluents containing fuel material as well as nonradiological pollutants associated with nuclear fuel production.

#### 1. Manufacturing - Building 001, AI/Headquarters (146,926 sq ft; ~230 Occupants)

The pertinent operations in Building 001 include two types of reactor fuel element manufacture: Advanced Test Reactor (ATR) fuel elements and Experimental Breeder Reactor (EBR-II) fuel elements.

##### a. ATR Fuel Element Manufacture

##### (1) Process Description Summary

In this operation, the uranium metal which is to be fabricated into ATR fuel elements is received as raw stock into the DeSoto facility Special Nuclear Material (SNM) Vault. The material is weighed, sampled, and stored until released for the fuel fabrication process. Each uranium metal receipt consists

of broken uranium buttons. The enriched raw uranium stock and aluminum are weighed to predetermined masses for each melting charge. Six charges generally comprise a heat. Six heats comprise a melting operation to obtain a  $UAl_x$  blend batch.

After completion of each  $UAl_x$  blend operation, which consists of crushing and sieving of the original buttons plus all subsequent recyclable materials, the furnace is cleaned and a "material balance" is made of the operation. Furnace scrap is collected in approved containers and transferred to the SNM Vault for interim storage.

Prior to crushing each heat of buttons, a weight check is made to assure conformity to the weight specified on the records. These two weights must agree to within one gram. The buttons are then introduced into the crusher glovebox. The buttons are broken down and the resultant powder is placed on a sieve shaker to separate the desired mesh size material from that requiring further processing.

Depending upon the type of fuel plate desired, predetermined quantities of  $UAl_x$  and Al powders are individually weighed to an accuracy of at least 0.005 grams and these materials are then combined into a single glass jar. A maximum of 24 of these jars are loaded during any one operational sequence. After blending, the jars are moved to the compacting press. A jar of material is loaded into a die and pressed into a fuel compact. After pressing, each compact is scribed with an identifying serial number. Waste generated during these operations is segregated into "recoverable" and "nonrecoverable" lots. The serialized fuel compacts are then transferred from the compacting operation to the fuel plate fabrication operation. Each compact is inserted in turn into a "picture frame" assembly which is then welded to essentially encapsulate the compact. Fuel plates are next transferred from the Plate/Element Storage Area to the Fuel Element Fabrication Area for assembly into the fuel elements. Element assembly records are established. All plates and elements, whether in interim or final form, which are not being actively processed, are stored in the Plate/Element Storage Area. This area consists of a vault-type room specifically designed for storage of these items. Scrap from the various operations is transferred to the SNM Vault to be held until further disposition has been determined.

Finished fuel elements are stored in special racks in the Plate/Element Storage Vault within the ATR area until the exact shipping date is established. One day prior to shipment, elements are loaded into special shipping containers. After each shipping container is loaded, NMM (Nuclear Material Management) personnel seal the container with a special tamper-indicating seal. Loaded and sealed shipping containers are then moved into the DeSoto SNM Vault for overnight storage, pending arrival of the shipping vehicle. Final shipping arrangements are the responsibility of the AI Traffic Department and are performed in accordance with DOT, and NRC criteria. NMM record information on the shipping lots includes the following:

- 1) Fuel element serial numbers
- 2) Fuel plate serial numbers
- 3) Fuel plate SNM content
- 4) Fuel element SNM content, including limits of error

This program may require up to 900 kg  $U^{235}$  in storage and in process.

(2) Potential Contaminants

Nuclear fuel materials handled in unencapsulated form in this operation contain the uranium isotopes:  $U^{234}$ ,  $U^{235}$ ,  $U^{236}$ , and  $U^{238}$ .

Atmospherically discharged contaminants would include combustion products generated by space heating with natural gas.

b. EBR-II Fuel Element Fabrication

(1) Process Description Summary

The other pertinent activity in Building 001 is the manufacture of EBR-II fuel elements. The objective of this program is to fabricate and deliver EBR-II Mark II fuel elements. The fabrication of these fuel elements is divided into three phases or activities. The first phase involves the fabrication of jacket assemblies consisting of cladding tubes, tips, and a wire wrap. The second phase involves the fabrication of the fuel pins which consists of alloy preparation, injection casting, and cropping the fuel pins to the proper size. This also includes the chemical analysis and inspections necessary to meet the specifications.

The third phase is concerned with fabrication of a fuel element assembly and this consists of loading the jacket with sodium and fuel, making the final closure weld, heat treating and bonding the sodium to the fuel and jacket, eddy current testing, dimpling of the fuel element, final inspection of the assembled fuel element, packaging, and shipment to the Argonne National Laboratory.

At maximum throughput approximately 600 kg of uranium-235 is required in storage and process.

(2) Potential Contaminants

Nuclear fuel materials handled in unencapsulated form in this operation contain the uranium isotopes:  $U^{234}$ ,  $U^{235}$ ,  $U^{236}$ , and  $U^{238}$ .

Additional gaseous contaminants would include combustion products generated from space heating by natural gas.

2. Laboratories - Building 004, AI/Headquarters  
(106,350 sq ft; ~154 Occupants)

The operations in Building 004 involving fuel materials include research studies in physics and chemistry and the chemical analysis of small quantities of reactor fuel material, usually limited to a few grams.

a. Analytical Chemistry Laboratories

(1) Process Description Summary

The analytical chemistry laboratories in Building 004 handle only small quantities of materials, generally <20 g per sample. The processes used are those normally associated with analytical chemistry. Typical operations involve:

Visual examination and dividing or aliquoting samples

Weighing

Dissolving in acids such as HF,  $HNO_3$ , HCl,  $HClO_4$ , and  $H_2SO_4$

Igniting

Diluting, decanting, and filtering

Titration and instrument readouts

Dissolution in organic solvents

Extracting using solvents

The amounts of chemical reagents used are relatively small. Typically, acid and organic solvents are purchased and used in quantities of less than a gallon while solid chemicals are generally used from containers of less than a pound capacity.

(2) Potential Contaminants

Small quantities of ordinary chemicals as listed here plus nuclear fuel material in unencapsulated form contain the uranium isotopes:  $U^{234}$ ,  $U^{235}$ ,  $U^{236}$ , and  $U^{238}$ .

b. Advanced Nuclear Fuels

(1) Process Description Summary

Laboratory scale tests are also being carried out in Building 004 with <25-g quantities of normal or depleted uranium metal in the preparation of compounds in combination with carbon monoxide to characterize the properties of this new uranium compound. These tests involve heating small amounts (10 grams or less) of the uranium compound to high temperatures in closed containers. Work involving uranium compound is carried out in laboratories equipped to safely handle such substances.

(2) Potential Contaminants

Uranium-238 and carbon monoxide are considered potential contaminants.

3. Component Development Hot Cell-- Building 020, NDFL  
(17,799 sq ft; ~10 Occupants)

a. Preparation of Fuel

(1) Process Description Summary

The operations in Building 020 currently involve the preparation of irradiated Sodium Reactor Experiment (SRE) fuel for eventual reprocessing by removal of the metal cladding and thermal bonding material, cleaning and repackaging of the fuel slugs and shipping the fuel for reprocessing.

Core I fuel consists of low-enrichment uranium metal, clad with stainless steel and NaK bonded (between fuel and cladding). Core II fuel consists of thorium-uranium alloy with highly enriched uranium, clad with stainless steel

and NaK bonded. In addition, several miscellaneous SRE test elements will be prepared for processing. The majority of the irradiated fuel is stored in element form in special storage cans. Each fuel element consists of from five to seven fuel rods. Each rod is made up of several fuel slugs clad in a stainless steel sheath and thermally bonded with NaK. A few storage cans contain less material than a full element.

At the disassembly station, the fuel elements are removed from the fuel cans and disassembled. The disassembled fuel rods are transferred to a washing tank to remove any external residual Na or NaK. The fuel slugs are pushed out of the cladding tubes and washed to remove any residual NaK. The fuel slugs are further cleaned by brushing with alcohol and immersing in an ultrasonic tank.

The clean fuel slugs are transferred into a shipping cannister and the lid is welded on. The shipping cannister is then returned to the SRE fuel storage vault.

## (2) Potential Contaminants

Radioactive materials handled in encapsulated or unencapsulated form contain the uranium isotopes:  $U^{234}$ ,  $U^{235}$ ,  $U^{236}$ , and  $U^{238}$ , thorium,  $Cs^{137}$ ,  $Sr^{90}$ ,  $Y^{90}$ ,  $Kr^{85}$ , and  $Pm^{147}$  as mixed fission products. Additional gaseous contaminants include combustion products generated by space heating with natural gas.

## 4. Nuclear Materials Development Facility - Building 055, NDFL (12,914 sq ft; ~10 Occupants)

### a. Fuel Pin Manufacture

#### (1) Process Description Summary

The operations in Building 055 which may generate effluents containing radioactive contaminants involve the fabrication of plutonium and uranium-plutonium fuel pins for irradiation testing in various test reactors and LMFBR's. A starting material batch of highly enriched and depleted  $UO_2$ ,  $PuO_2$  and graphite is converted to fuel pins containing mixed uranium plutonium carbides. The schedule throughput requires an inventory of approximately 1 kg  $U^{235}$  and 2.5 kg plutonium.

The operations involved in the conduct of this program are:

- 1) Receival, sampling analysis, and storage of raw feed materials, including ceramic grade  $\text{PuO}_2$  powder, enriched  $\text{UO}_2$  powder, and depleted  $\text{UO}_2$  powder.
- 2) Batch weighing, blending, and agglomeration of  $\text{PuO}_2$  powder,  $\text{UO}_2$  powder, and graphite.
- 3) Carbothermic reduction of oxide powders and graphite to plutonium-uranium carbides.
- 4) Crushing, milling, and agglomeration of carbide.
5. Fast Critical Experiment Laboratory - Building 100, NDFL  
(7,041 sq ft; 0 to 3 Occupants) (May increase to ~8 Occupants in the near future)

This building formerly housed a licensed critical facility which has been decommissioned, thus releasing the building for other use. At the present time, most of the building is in an inactive status, largely being utilized for temporary storage of various pieces of equipment. However, specific activities currently in progress or planned for the facility includes centrifuging of encapsulated plutonium materials.

a. Centrifuge - Sodium Bonding of Nuclear Fuel Pins

(1) Activity Description Summary

A planned activity in Building 100 is the use of a centrifuge for the "hot bonding" of nuclear fuel pins with sodium. The function of the centrifuge is to force gas voids from the sodium thermal bond. The centrifuge is located in the (former) critical assembly room of Building 100 and is operated by remote control in this building. The critical assembly room is equipped with a gasketed rolling shield door and has concrete walls from 2 to 5 ft thick. Shield door interlocks prevent the operation of the centrifuge until the room is sealed shut. The room ventilation air exhaust is continuously monitored with an alpha air monitor for radioactivity. After completion of a centrifuge bonding operation, an alpha air monitor and pumping system are attached to the bucket valve, and air is allowed to enter the bucket to a pressure of 10 to 12 psia. This air is then pumped through the alpha air monitor to verify that the fuel pins are intact.

(2) Potential Contaminants

The various fuel materials (depleted and enriched uranium and plutonium) contain the following radionuclides:  $U^{234}$ ,  $U^{235}$ ,  $U^{236}$ ,  $U^{238}$ ,  $Pu^{238}$ ,  $Pu^{239}$ ,  $Pu^{240}$ ,  $Pu^{241}$ , and  $Am^{241}$ .

## II. AIR AND WATER POLLUTION CONTROL DEVICES

Gases and liquid effluents released either continuously or periodically from the facilities described in Section B-I may contain low concentrations of fuel material, or other pollutants. Every effort is made to minimize such pollutants to as low levels as practicable. The levels of pollutants contained in atmospherically discharged effluents are reduced to the lowest practicable values by the use of engineering safeguards such as total containment, contamination control, process isolation, and the use of high efficiency (HEPA) filtration ventilation systems. Exhaust air streams are continuously sampled for particulate radioactive material by means of continuous stack exhaust samplers installed at or near the point of control loss. Additionally, monitoring systems installed at Buildings 020 and 055 provide automatic alarm capability in the event of a gaseous or particulate radioactivity release from these facilities.

The performance specification for HEPA filtration systems require 99.9% removal (0.01% penetration) of air stream entrained  $0.8\ \mu\text{m}$  diameter particles for uranium and low-toxicity radionuclide areas and 99.99% for plutonium and high-toxicity areas. The operating efficiencies of the HEPA filtration system are evaluated by in-place testing with a polydispersed dioctylphthalate (DOP) aerosol generated with a  $0.3\ \mu\text{m}$  median diameter, the concentration of which is measured with a forward scattering light photometer to determine filtration efficiency. Frequency of testing is at least annually or following the replacement of HEPA filters in the system.

Liquid wastes generated at AI/Headquarters facilities are discharged off-site to the city sanitary sewage system. Such discharges are considered to be to a controlled area as provided for by the Regulations governing off-site discharges. No intentional or planned releases to surface waterways of either radioactive or nonradioactive pollutants occur at Headquarters or NDFL.

Specific information on the effluent control devices installed at each facility conducting NRC licensed operations together with a summary of HEPA filtration system test data is provided to evaluate the efficiency for these systems for atmospherically discharged pollutant control.

## A. AI/HEADQUARTERS

Building 001 — Fuel materials in unencapsulated form are processed in areas served by two HEPA filtered exhaust systems. The systems are EF-15 which exhausts the EBR-ATR fuel element production area, and EF-32, which exhausts the Metallurgical and Quality Control laboratories.

Thus, each area is served by a separate exhaust system. The exhaust air is discharged to the atmosphere from stacks located on the facility roof which are about 30 ft above ground level. Each exhaust system is equipped with a pressure sensitive device which provides an alarm in the event of a blower failure. Exhaust fan EF-15 has a nominal discharge rate of 34,900 ft<sup>3</sup> of air per minute. The system filtration efficiency is approximately 99.92% for removal of the DOP test aerosol.

Liquid wastes from the controlled area flow into 1500-gal waste retention tanks pending analysis for radioactivity concentration and final disposal to the city sanitary sewer system.

Building 004 — Fuel material in unencapsulated form is processed only in the one controlled area within the facility in which the air is exhausted by a single exhaust system identified as EF-401. The exhaust stack is on the facility roof approximately 30 ft above ground. EF-401 has a nominal discharge rate of 20,000 ft<sup>3</sup>/min. The system filtration efficiency is approximately 99.99% for removal of the DOP test aerosol. Radioactivity bearing liquid wastes are not permitted into the laboratory drain system but are separately collected for disposal. All laboratory liquid wastes drain into a flow-proportional sampler which samples and retains an aliquot of the wastewater volume discharged to the city sewer system. The aliquots are composited and analyzed for radioactivity.

Building 020 — Fuel material in unencapsulated form is processed only within one of four examination "hot" cells. The general area ventilation system exhausts air from the change-room, manipulator repair room, hot laboratory, and operating gallery, all located within the primary building. The exhaust system has a nominal discharge rate of approximately 23,000 ft<sup>3</sup>/min for the general facility exhaust system and approximately 13,000 ft<sup>3</sup>/min for the cell high volume exhaust. Filtration efficiency is approximately 99.99% for the DOP test aerosol.

Radioactive liquid wastes are not released from the facility to uncontrolled areas.

Building 055 — Fuel material in unencapsulated form is handled only in the glove boxes and transfer tunnels, with the exception of minute quantities used for analytical chemistry purposes in the support laboratory. The facility is equipped with a dual ventilation system. One, a high-volume system exhausts the working area. A separate low-volume system is used for the glove boxes. Under normal conditions, the low-volume system is used only to maintain a negative pressure in the glove boxes with respect to the room. All air is exhausted through at least one HEPA filter prior to discharge to the atmosphere. The single exhaust stack has a nominal air flow of 23,000 ft<sup>3</sup>/min which includes both the low- and high-volume exhaust air and makeup air at the stack. Minimum acceptable filtration efficiency for the exhaust systems is 99.95%. All systems have exceeded this efficiency as tested by the DOP aerosol method.

No radioactive liquid waste is released from the facility to uncontrolled areas.

Building 100 — No operations with unencapsulated fuel material are conducted at this facility. Planning continues for centrifuge separation of fully encapsulated plutonium-uranium carbide fuel pins in the facility; however, no startup date is available. The facility formerly contained a research critical assembly which was dismantled in 1972. Three HEPA filtration systems exhaust the building and are identified as the Reactor Room, Subassembly Room, and Fuel Vault systems. Minimum acceptable filtration efficiency for each of the three systems is 99.95%. All systems have exceeded this efficiency as tested by the DOP method.

No liquid wastes bearing radioactivity are generated in this facility; however, a liquid waste storage system is available, if required.

### III. RADIOLOGICAL AND NONRADIOLOGICAL CONTAMINANTS

The material requested by the Guide for this section, i. e. , the contaminants resulting from sources are identified and included in Chapter B-I.

#### IV. ESTIMATES OF EMISSION RATES AND CONCENTRATION VALUES

The emission rates for atmospherically discharged radioactive pollutants released from the sources described in Section B-I are determined by continuous sampling and monitoring of the exhaust airstreams. The evaluation of radiological emissions is enhanced by the relative sensitivity of these measurements as compared to the measurement difficulty encountered with nonradiological pollutants at equally low concentrations. A summary of radiological emission values for each applicable release point at both AI Headquarters facility and the NDFL is presented in Table B-IV-1 for the year 1974 and 1975. These years are considered to be the most representative of current programs conducted in the facilities.

Additionally, since natural gas is used for space heating at AI facilities, it is necessary to consider those pollutants that may be generated from that source. The amount of carbon monoxide produced by natural gas combustion in the excess air burners used at AI is negligible. The amount of carbon dioxide produced depends on the fuel being burned. Natural gas is rich in hydrogen by comparison with other fuels. Therefore, in excess air combustion conditions where partial oxidation will not occur, all of the carbon in the gas is converted to carbon dioxide. For the natural gas supplied to AI, one cubic foot of gas burns with two of oxygen to form one cubic foot of carbon dioxide, plus two cubic feet of water vapor. From this, following estimated annual carbon dioxide emission rates based on natural gas consumption for each site are presented:

AI/Hq.	- Bldg 001	- $9.2 \times 10^6 \text{ ft}^3/\text{yr}$
	Bldg 004	- $5.0 \times 10^5 \text{ ft}^3/\text{yr}$
AI/NDFL	- Bldgs 020/055	- $9.0 \times 10^6 \text{ ft}^3/\text{yr}$

Liquid radioactivity bearing effluents are not discharged to uncontrolled areas from any AI facility. Discharges of low-level radioactively contaminated wastewater to the city sewer system, a controlled area, are periodically made from Building 001 at the Headquarters site. Continual discharge of Building 004 laboratory liquid wastewater, which does not normally contain unnatural radioactive material, is also made to the sewer system. These discharges are

TABLE B-IV-1  
RADIOLOGICAL EMISSION VALUES

Bldg/Exhaust No.	Approximate Annual Exhaust Volume (ft <sup>3</sup> )	Single Sample Minimum (μCi/ml x 10 <sup>-16</sup> <sub>a</sub> )		Annual Average (μCi/ml x 10 <sup>-16</sup> <sub>a</sub> )		Single Sample Maximum (μCi/ml x 10 <sup>-16</sup> <sub>a</sub> )		Curies Released (a)	
		1974	1975	1974	1975	1974	1975	1974	1975
AI/HQ Bldg 001									
EF-15	2.0 x 10 <sup>10</sup>	<1.6	1.6	<6.9	63.4	82.1	329.0	<3.9 x 10 <sup>-7</sup>	3.6 x 10 <sup>-6</sup>
EF-32	5.6 x 10 <sup>9</sup>	<3.8	<3.8	<5.8	<9.1	35.0	77.6	<9.3 x 10 <sup>-8</sup>	<1.4 x 10 <sup>-7</sup>
AI/HQ Bldg 004									
EF-401	8.9 x 10 <sup>9</sup>	<4.0	<4.0	<8.8	<4.5	22.4	6.5	<2.3 x 10 <sup>-7</sup>	<1.1 x 10 <sup>-7</sup>
AI/NDFL									
Bldg 020	2.1 x 10 <sup>10</sup>	<0.83	<0.89	<3.3	<2.6	23.7	5.3	<2.0 x 10 <sup>-7</sup>	<1.5 x 10 <sup>-7</sup>
Bldg 055	1.6 x 10 <sup>10</sup>	<1.8	<2.4	<2.7	<4.2	12.2	27.8	<1.2 x 10 <sup>-7</sup>	<1.9 x 10 <sup>-7</sup>
Bldg/Exhaust No.	Approximate Annual Exhaust Volume (ft <sup>3</sup> )	Single Sample Minimum (μCi/ml x 10 <sup>-14</sup> <sub>β</sub> )		Annual Average (μCi/ml x 10 <sup>-14</sup> <sub>β</sub> )		Single Sample Maximum (μCi/ml x 10 <sup>-14</sup> <sub>β</sub> )		Curies Released (β)	
		1974	1975	1974	1975	1974	1975	1974	1975
AI/HQ Bldg 001									
EF-15	2.0 x 10 <sup>10</sup>	<0.052	<0.052	<0.22	<0.41	0.78	2.4	<1.3 x 10 <sup>-6</sup>	<2.3 x 10 <sup>-6</sup>
EF-32	5.6 x 10 <sup>9</sup>	<0.15	<0.15	<0.53	<0.16	3.0	0.34	<8.5 x 10 <sup>-7</sup>	<2.5 x 10 <sup>-7</sup>
AI/HQ Bldg 004									
EF-401	8.9 x 10 <sup>9</sup>	<0.16	<0.16	<1.7	<0.25	4.9	0.82	<4.4 x 10 <sup>-6</sup>	<6.4 x 10 <sup>-7</sup>
AI/NDFL									
Bldg 020	2.1 x 10 <sup>10</sup>	0.38	0.50	1.4	1142.2	3.6	27300.	8.3 x 10 <sup>-6</sup>	6.7 x 10 <sup>-3</sup>

Note: Samples having concentrations less than the minimum detection limit are assumed to have concentration equal to the detection limit. Such data are indicated by the (<) indicator.

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monitored by either batch type sampling for Building 001 releases, or by flow-proportional sampling for Building 004 releases. Data on radioactivity concentrations in these effluents for the years 1974 and 1975 are presented in Table B-IV-2. No discharge of unnatural radioactivity bearing liquid effluent to uncontrolled areas from the NDFL is done, therefore no values for that site are included in the table. Refer to the environmental radioactivity summary section for surface water radioactivity concentrations for several NDFL sampling locations.

The discharge of industrial wastewater to the Los Angeles City Sewer System from the Headquarters site is permitted under Permit N-19412 issued by the Department of Sanitation. The concentration of several nonradioactive constituents in the wastewater determined on a quarterly basis by composite sampling for the years 1974 and 1975 are presented in Table B-IV-3. Also shown are guide values for selected constituents specified under Bureau of Sanitation Regulations.

The discharge of wastewater from Rockwell International facilities located at Santa Susana, Rocketdyne Division SSFL and Atomics International Division NDFL, to uncontrolled areas is allowed under a NPDES discharge permit. This specifies that grab-type samples are to be taken prior to each retention pond discharge which are analyzed for specified nonradioactive constituents and gross radioactivity. The samples are analyzed by a California State certified analytical testing laboratory. Discharge of up to 3,500,000 gal/day of overflow is permitted only to Bell Creek from the retention pond. Only one of several final retention ponds receives influent from NDFL facilities. The influents include sewage treatment plant effluent and surface runoff water. Off-site discharge generally occurs only during and immediately following periods of heavy rainfall or during extended periods of rocket engine testing.

The results of analyses for each discharge during 1974 are presented in Table B-IV-4, and the results for each discharge during 1975 are presented in Table B-IV-5.

TABLE B-IV-2  
AI/HEADQUARTERS FUEL PROCESS AREA AND LABORATORY RADIOACTIVE  
LIQUID EFFLUENT SUMMARY - 1974 AND 1975

Building	Annual Discharge Volume (gal)	Single Sample Minimum Concentration ( $\mu\text{Ci/ml} \times 10^{-7}$ )		Annual Average Concentration ( $\mu\text{Ci/ml} \times 10^{-7}$ )		Single Sample Maximum Concentration ( $\mu\text{Ci/ml} \times 10^{-7}$ )		Total Curies Released*	
		$\alpha$	$\beta$	$\alpha$	$\beta$	$\alpha$	$\beta$	$\alpha$	$\beta$
AI/Headquarters - Building 001 Fuel Processing	3,000	1.1	1.2	2.3	0.20	3.4	2.1	$2.6 \times 10^{-6}$	$1.9 \times 10^{-6}$
	17,100	0.4	0.6	3.6	10.0	18.6	68.9	$2.3 \times 10^{-5}$	$6.4 \times 10^{-5}$
AI/Headquarters - Building 004 Laboratories	1,209,300	0.01	0.03	0.083	0.51	0.39	4.4	$3.2 \times 10^{-5}$	$2.3 \times 10^{-4}$
	1,694,200	0.01	0.01	0.072	0.42	0.52	7.6	$4.6 \times 10^{-5}$	$2.7 \times 10^{-4}$

\* Includes radioactivity occurring naturally in water.

TABLE B-IV-3  
NONRADIOACTIVE CONSTITUENTS DISCHARGED FROM  
AI/HEADQUARTERS, 1974 AND 1975

Constituent	Units	Guide Value	First Quarter 1974	Second Quarter 1974	Third Quarter 1974	Fourth Quarter 1974	First Quarter 1975	First† Quarter 1975	Second Quarter 1975	Third Quarter 1975	Fourth Quarter 1975
pH	pH units	5.5-11	8.5	8.65	7.8	7.2	8.2	7.9	8.1	7.4	7.4
Specific Conductance	mohs/cm	*	747	689	584	698	424	545	642	715	706
Chemical Oxygen Demand (COD)	mg/l	*	238	233	185	286	238	285	333	745	1334
Biological Oxygen Demand (BOD)	mg/l	*	87.8	115	59	112	96	142	97	369	126
Suspended Solids	mg/l	1000	54.5	58	22	66	70	49	111	107	322
Arsenic	mg/l	*	0.002	0.05	0.03	0.04	0.01	0.02	0.01	0.01	0.03
Cyanide	mg/l	2.0	<0.01	<0.005	0.005	0.005	<0.005	<0.005	0.005	0.056	<0.005
Phenols	mg/l	*	<0.05	<0.05	0.05	0.45	0.1	0.1	0.05	0.70	0.24
Oil and Grease	mg/l	600	12.0	70.4	8.4	10.8	12.6	15	20.2	53.0	12.2
Chlorinated Hydrocarbons	mg/l	0	<0.01	<0.01	1.058	0.213	<0.01	<0.03	0.01	0.001	<0.002
Cadmium	mg/l	5.0	0.0012	0.003	0.03	0.005	0.001		0.002	0.0003	0.002
Lead	mg/l	*	0.005	0.01	0.01	0.005	0.005		0.002	0.0006	0.085
Mercury	mg/l	0	0.0012	0.0003	0.001	0.0003	0.0001		0.003	0.0002	0.00005
Copper	mg/l	*	0.032	0.07	0.120	0.035	0.015		0.035	0.070	0.085

\* Guide value not established

† Additional sample

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TABLE B-IV-4  
NONRADIOACTIVE CONSTITUENTS IN WASTEWATER  
DISCHARGED TO UNRESTRICTED AREAS - 1974  
(Analysis results for wastewater discharged to Bell Creek  
on date indicated - Sample Station W-12)

Constituent	April 18		June 26		Sept 19		Dec 10		Dec 12		Limits of Detection
	Result	% of Guide	Result	% of Guide	Result	% of Guide	Result	% of Guide	Result	% of Guide	
Total Dissolved Solids (mg/l)	445	44	520	52	495	50	605	61	420	42	0.1
Total Hardness (mg/l)	NA	-	163	33	208	42	246	49	175	35	0.1
Chloride (mg/l)	NA	-	90	36	88	35	105	42	72	29	0.1
Chloride plus Sulfate (mg/l)	NA	-	NA	-	203	27	NA	-	NA	-	1.1
Suspended Solids (mg/l)	12	-	ND	-	ND	-	3	7	8	18	0.1
Settleable Solids (ml/l-hr)	0.1	-	ND	-	<0.1	-	<0.1	<50	0.1	<50	1
BOD (mg/l)	31	-	6	-	12	-	30	100	31	103	0.1
Oil and Grease (mg/l)	7	28	1	4	3	12	6	40	8	53	0.1
Nitrate Nitrogen (mg/l)	1.4	3	1.5	3	4.1	8	2.4	24	7.7	77	0.1
Color (in color units)	NA	-	13	65	28	140	17	85	15	75	1
Turbidity (TU)	47	47	12	12	10	10	8	11	20	27	0.1
Total Chromium (mg/l)	ND	-	ND	-	ND	-	ND	-	ND	-	0.01
Fluoride (mg/l)	0.72	48	0.92	61	0.64	43	0.52	52	0.52	52	0.01
Boron (mg/l)	ND	-	ND	-	ND	-	0.24	24	1.2	120	0.01
Residual Chlorine (mg/l)	NA	-	NA	-	NA	-	NA	-	NA	-	0.01
Fecal Coliform (MPN/100 ml)	>16.0	-	NA	-	NA	-	NA	-	NA	-	2.2
Surfactants (mg/l)	NA	-	NA	-	ND	-	0.10	20	0.17	34	0.01
pH	8.2		8.9		8.4		7.7		7.7		0.02

NA - Not available. Analysis not requested or not performed  
ND - None detected. Level below limit of detection

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TABLE B-IV-5

NONRADIOACTIVE CONSTITUENTS IN WASTEWATER  
DISCHARGED TO UNRESTRICTED AREAS - 1975  
(Analysis results for wastewater discharged to Bell Creek  
on date indicated - Sample Station W-12)

	February 3-9		March 12		April 4		June 2		December 23		Limits of Detection
	Result	% of Guide	Result	% of Guide	Result	% of Guide	Result	% of Guide	Result	% of Guide	
Total Dissolved Solids (mg/l)	293	29.3	330	33.0	510	51.0	380	38.0	485	48.5	0.1
Total Hardness (mg/l)	129	25.8	107	21.4	142	28.4	157	31.4	176	35.2	0.1
Chloride (mg/l)	80	32.0	42	16.8	48	19.2	71	28.4	84	33.6	0.1
Chloride plus Sulfate (mg/l)	150	30.0	116	23.2	NA	-	150	30.0	177	35.4	1.1
Suspended Solids (mg/l)	NA	-	8	17.8	8	17.8	19	42.2	ND	-	0.1
Settleable Solids (ml/l-hr)	NA	-	<0.1	<50.0	<0.1	<50.0	<0.1	<50.0	ND	-	1.0
BOD (mg/l)	NA	-	9	30	ND	-	10	33.3	5	16.7	0.1
Oil and Grease (mg/l)	ND	-	16	107	17	113	6	40.0	4	26.7	0.1
Nitrate Nitrogen (mg/l)	7	70	5.5	55.0	1.8	18.0	0.1	1.0	0.8	8.0	0.1
Color (in color units)	NA	-	22	110	40	200	23	115	25	125	1
Turbidity (TU)	NA	-	32	42.7	20	26.7	24	32	1.6	2.1	0.1
Total Chromium (mg/l)	ND	-	ND	-	ND	-	ND	-	ND	-	0.01
Fluoride (mg/l)	0.4	40.0	0.52	52.0	0.38	38.0	0.34	34.0	0.60	60.0	0.01
Boron (mg/l)	0.2	20.0	ND	-	ND	-	ND	-	ND	-	0.01
Residual Chlorine (mg/l)	NA	-	ND	-	ND	-	ND	-	ND	-	0.01
Fecal Coliform (MPN/100 ml)	NA	-	240	60.0	240	60.0	2	0.5	4.5	1.1	2.2
Surfactants (mg/l)	NA	-	0.10	20.0	0.09	18.0	0.3	60.0	0.1	20.0	0.01
pH	8.7		7.4		8.7		9.2		7.5		0.02

NA - Not available; analysis not requested or not performed.  
ND - None detected; level below limit of detection.

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B-IV-7

## V. MEASUREMENT OF MAXIMUM AIR CONCENTRATION INTEGRALS OF RADIOLOGICAL AND NONRADIOLOGICAL EFFLUENTS

It was noted in Section B-IV that the gases discharged to uncontrolled areas show extremely low concentrations at the release point with respect to the guide levels (10 CFR 20 for radiological effluents). The only nonradiological pollutant discharged was CO<sub>2</sub> produced by the combustion of natural gas with excess air. The low release concentrations are confirmed by the ambient on-site air radioactivity concentration data. This monitoring is performed at or near the sources of air effluent monitoring performed at the release point.

Further discussion of these low releases may be found in Section B-XI where the 50-year-radiation dose commitment calculations are presented. In all cases, the maximum possible 50-year-dose commitment for members of the general public is less than 1 mrem.

## VI. DETERMINATION OF WATER CONCENTRATION VALUES

The planned discharge of radioactivity bearing liquid effluents from AI is limited to discharge from Headquarters fuel processing areas. These discharges are to the city sewer system which is a radiologically controlled area.

There have been no planned discharges of liquid effluents contaminated by radiological or nonradiological pollutants above guide levels from the NDFL facilities to the surface waterways. However, a monitoring program is maintained to identify selected pollutants in wastewater discharged off-site. These data are shown in Section B-IV. In two cases where the data showed values in excess of the guide, i. e., color — 100% above, and oil and grease — 13% above, the values can be attributed to the natural characteristics of the water (in the case of the color) and to the reuse of the water for rocket engine test stand cooling (in the case of oil and grease). The respective concentration limits are shown in Section B-XVI.

## VII, VIII, IX. MEASUREMENT OF VALUES OF RADIOLOGICAL POLLUTANTS IN ENVIRONMENTAL SAMPLES

Soil, vegetation, stream bed sediment, and surface water are sampled to a distance of 10 miles from AI sites. Also, continuous ambient air sampling for evaluating airborne radioactivity and thermoluminescent dosimetry for evaluating ambient radiation levels is performed. Sampling stations located within the boundaries of AI sites are referred to as "on-site" stations. Those stations located on adjacent Rockwell or other private property up to a distance of 10 miles are referred to as "off-site" stations. On-site stations are sampled monthly including the off-site Bell Canyon station. The remaining off-site stations are sampled quarterly.

Selection of sample station locations is based upon several site-specific factors, such as topography, meteorology, hydrology, and the location of nuclear facilities. The prevailing wind direction at both the Headquarters and NDFL sites is generally N to NW with some seasonal diurnal shifting to the SE quadrant. No discharge of polluted wastewater to uncontrolled areas occurs at the Headquarters site. Surface run-off water at the NDFL flows through several natural watercourses and collects in a large capacity retention pond. This water may be discharged off-site into Bell Canyon to the south, or it may be re-used for industrial purposes.

The Sampling Station maps (Figures B-XIII-1 and -2) indicate that the locations provide comprehensive coverage relative to diurnal wind variability with respect to the nuclear facilities and the surface waterways.

In calculating the averaged concentration values, those samples having radioactivity levels less than their minimum detection levels (MDL) are assumed to have a concentration equal to MDL. Thus, for measurements in which some apparent radioactivity concentrations are below the MDL, the true average value is actually less than the value reported. These data are shown in the tables as "less than" (<) values.

The average radioactivity concentrations measured in soil samples for the period 1971 through 1975 are presented in Table B-VII-1. Also shown are the annual total number of samples analyzed for each sample station and the appropriate MDL.

TABLE B-VII-1  
ANNUALLY AVERAGED SOIL RADIOACTIVITY CONCENTRATIONS FOR EACH SAMPLING STATION

Sample Station	Annual No. of Samples	$\alpha$ (pCi/gram)					$\beta$ (pCi/gram)				
		1971	1972	1973	1974	1975	1971	1972	1973	1974	1975
SV-1 On-Site	12	0.58	0.63	0.57	0.64	0.63	25	26	25	25	26
SV-2 On-Site	12	0.61	0.68	0.53	0.59	0.59	26	27	24	25	26
SV-3 On-Site	12	0.63	0.59	0.66	0.71	0.61	28	28	26	30	27
SV-4 On-Site	12	0.50	0.47	0.52	0.49	0.53	23	23	23	22	23
SV-5 On-Site	12	0.50	0.55	0.46	0.47	0.48	24	24	22	22	24
SV-6 Off-Site	4	0.59	0.55	0.51	0.63	0.61	24	25	24	26	24
SV-10 Off-Site	4	0.48	0.64	0.51	0.67	0.85	23	24	24	23	24
SV-12 On-Site	12	0.63	0.68	0.66	0.72	0.65	25	26	25	25	26
SV-13 On-Site	12	0.51	0.45	0.68	0.59	0.47	26	26	26	24	24
SV-14 On-Site	12	0.64	0.50	0.57	0.63	0.61	26	25	26	26	27
SV-19 Off-Site	4	0.68	0.84	0.64	0.67	0.66	26	28	25	25	26
SV-24 On-Site	12	0.43	0.49	0.46	0.55	0.54	22	23	23	24	24
SV-25 Off-Site	4	0.48	0.56	0.58	0.56	0.54	23	23	23	23	23
SV-26 Off-Site	4	0.52	0.55	0.56	0.61	0.48	23	23	24	24	23
SV-27 Off-Site	4	0.53	0.47	0.49	0.58	0.47	23	23	23	24	22
SV-28 Off-Site	4	0.50	0.50	0.51	0.45	0.46	22	23	23	23	22
SV-31 Off-Site	4	0.47	0.47	0.42	0.47	0.48	25	24	24	25	26
SV-40 Off-Site	4	0.43	0.52	0.47	0.48	0.63	19	20	21	21	23
SV-41 Off-Site	4	0.53	0.65	0.58	0.50	0.53	23	23	24	21	22
SV-42 On-Site	12	0.51	0.59	0.52	0.55	0.46	25	25	24	24	24
SV-47 Off-Site	4	0.56	0.52	0.32	0.39	0.64	24	24	23	22	23
SV-51 On-Site	12	0.65	0.62	0.62	0.62	0.63	25	26	26	25	26
SV-52 On-Site	12	0.51	0.52	0.56	0.59	0.62	24	25	25	25	25
SV-53 Off-Site	4	0.54	0.62	0.56	0.52	0.59	26	25	25	25	24
Minimum Detection Limit		0.05	0.050	0.051	0.051	0.056	0.22	0.22	0.22	0.22	0.22

The average radioactivity concentrations measured in ashed vegetation samples for the period 1971 through 1975 are presented in Table B-VIII-1.

The average dry weight equivalent radioactivity concentrations that were measured in vegetation samples beginning with the last half of 1972 (when these measurements began) through 1975 are presented in Table B-VIII-2.

The average radioactivity concentrations measured in NDFL supply water, surface water in SSFL retention ponds, and in off-site Bell Creek water for the period 1971 through 1975 are presented in Table B-IX-1.

The average radioactivity concentrations measured in ambient air at both the Headquarters and NDFL sites are presented in Table B-IX-2. The table also shows the sampler locations and the total number of samples for each year.

The annually averaged ambient radiation dosimetry data for each monitoring station are presented in Table B-IX-3.

The average radioactivity concentration measured in stream bed and retention pond bottom sediments is presented in Table B-IX-4. Also presented are vegetation ash radioactivity concentration data for the Bell Creek station which is associated with the Bell Creek water and stream-bed station.

TABLE B-VIII-1  
ANNUALLY AVERAGED VEGETATION ASH RADIOACTIVITY CONCENTRATION FOR EACH SAMPLING STATION

Sample Station		Annual No. of Samples	$\alpha$ (pCi/gram)					$\beta$ (pCi/gram)				
			1971	1972	1973	1974	1975	1971	1972	1973	1974	1975
SV-1	On-Site	12	<0.17	<0.24	<0.23	<0.26	<0.17	203	156	166	136	166
SV-2	On-Site	12	0.41	0.31	<0.29	<0.37	<0.35	201	221	194	186	177
SV-3	On-Site	12	<0.12	<0.18	<0.23	<0.17	<0.30	149	139	136	143	138
SV-4	On-Site	12	<0.24	0.38	<0.39	<0.15	<0.18	165	126	144	157	168
SV-5	On-Site	12	<0.19	<0.10	<0.15	<0.15	<0.15	147	144	167	173	161
SV-6	Off-Site	4	<0.08	<0.11	<0.14	<0.23	<0.13	138	150	112	100	91
SV-10	Off-Site	4	<0.24	<0.28	0.38	<0.20	0.14	99	104	122	123	107
SV-12	On-Site	12	<0.37	<0.44	<0.24	<0.13	<0.35	157	143	156	171	163
SV-13	On-Site	12	0.56	0.72	<0.68	<0.55	<0.13	153	137	160	161	123
SV-14	On-Site	12	<0.06	<0.14	<0.12	<0.12	<0.20	161	141	139	143	144
SV-19	Off-Site	4	0.93	1.07	0.77	0.74	<0.36	126	112	119	121	148
SV-24	On-Site	12	<0.17	<0.23	<0.19	<0.14	<0.19	175	157	199	151	171
SV-25	Off-Site	4	<0.29	<0.30	<0.16	<0.25	<0.24	79	131	150	109	183
SV-26	Off-Site	4	<0.19	0.61	<0.16	0.24	<0.15	137	110	175	130	171
SV-27	Off-Site	4	0.23	<0.36	0.22	<0.20	0.26	106	144	133	126	136
SV-28	Off-Site	4	<0.19	0.33	<0.12	0.28	<0.34	138	87	144	168	149
SV-31	Off-Site	4	0.24	0.16	<0.16	<0.17	<0.26	161	151	146	171	134
SV-40	Off-Site	4	<0.07	0.20	<0.15	<0.11	<0.14	180	132	174	183	140
SV-41	Off-Site	4	<0.23	0.17	<0.22	<0.15	<0.12	147	120	137	165	149
SV-42	On-Site	12	<0.12	<0.12	<0.10	<0.15	<0.16	144	102	122	152	172
SV-47	Off-Site	4	0.51	0.38	<0.13	0.38	0.24	123	111	133	126	125
SV-51	On-Site	12	<0.19	<0.15	<0.14	<0.12	<0.14	174	130	138	125	139
SV-52	On-Site	12	<0.11	<0.10	<0.14	<0.13	<0.15	147	146	135	126	137
SV-53	Off-Site	4	<0.38	0.45	<0.27	<0.24	<0.12	153	159	158	169	162
Minimum Detection Limit			0.10	0.10	0.10	0.10	0.10	0.35	0.35	0.35	0.35	0.35

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TABLE B-VIII-2

ANNUALLY AVERAGED VEGETATION DRY WEIGHT RADIOACTIVITY CONCENTRATION FOR EACH SAMPLE STATION

Sample Station		Annual No. of Samples	$\alpha$ (pCi/gram)				$\beta$ (pCi/gram)			
			1972*	1973	1974	1975	1972*	1973	1974	1974
SV-1	On-Site	12	0.036	<0.056	<0.064	<0.018	22	24	20	18
SV-2	On-Site	12	0.025	<0.037	<0.045	<0.056	24	26	25	25
SV-3	On-Site	12	<0.021	<0.060	<0.025	<0.072	15	34	22	29
SV-4	On-Site	12	0.041	<0.066	<0.034	<0.027	22	26	30	26
SV-5	On-Site	12	<0.018	<0.035	<0.027	<0.021	25	27	29	25
SV-6	Off-Site	4	<0.019	<0.030	<0.066	<0.025	33	23	30	17
SV-10	Off-Site	4	<0.060	0.091	<0.040	0.028	25	28	24	20
SV-12	On-Site	12	<0.059	<0.062	<0.020	<0.088	19	29	26	28
SV-13	On-Site	12	0.100	<0.085	<0.088	<0.028	16	22	26	27
SV-14	On-Site	12	<0.027	<0.022	<0.021	<0.026	22	26	26	22
SV-19	Off-Site	4	0.247	0.122	0.162	<0.046	15	27	27	21
SV-24	On-Site	12	<0.051	<0.030	<0.027	<0.032	26	34	29	32
SV-25	Off-Site	4	<0.060	<0.053	<0.061	<0.062	25	36	27	45
SV-26	Off-Site	4	0.260	<0.033	0.058	<0.030	27	37	31	32
SV-27	Off-Site	4	0.166	0.045	<0.038	0.051	46	27	25	29
SV-28	Off-Site	4	0.144	<0.030	0.063	<0.070	23	35	36	33
SV-31	Off-Site	4	0.033	<0.038	<0.031	<0.078	22	35	33	36
SV-40	Off-Site	4	0.084	<0.035	<0.024	<0.038	23	40	39	36
SV-41	Off-Site	4	0.049	<0.063	<0.034	<0.024	26	34	38	30
SV-42	On-Site	12	<0.029	<0.020	<0.030	<0.033	19	22	29	28
SV-47	Off-Site	4	0.062	<0.049	0.098	0.063	22	55	33	34
SV-51	On-Site	12	<0.026	<0.028	<0.022	<0.033	20	25	21	23
SV-52	On-Site	12	<0.023	<0.022	<0.025	<0.035	28	20	22	28
SV-53	Off-Site	4	0.044	<0.058	<0.087	<0.023	16	29	40	30

Minimum detection limit varies according to ratio of dry weight to ash weight.

\*Data are for last six months only.

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TABLE B-IX-1  
ANNUALLY AVERAGED NDFL SUPPLY AND SURFACE WATER RADIOACTIVITY CONCENTRATION FOR EACH SAMPLE STATION

Sample Station	Annual No. of Samples	$\alpha$ (pCi/liter)					$\beta$ (pCi/liter)				
		1971	1972	1973	1974	1975	1971	1972	1973	1974	1975
W-6 SSFL Retention Pond	12	<0.20	<0.22	<0.23	<0.22	<0.24	6.2	5.3	4.5	4.2	4.2
W-7 Supply System	12	<0.31	<0.21	<0.29	<0.28	<0.25	4.8	3.7	3.5	2.9	2.4
W-11 Supply System	12	<0.26	<0.39	<0.23	<0.21	<0.24	5.0	3.7	3.2	2.6	2.3
W-12 SSFL Retention Pond	12	<0.20	<0.22	<0.37	<0.21	<0.31	6.4	5.5	5.6	4.4	4.5
W-16 Bell Creek	12	<0.20	<0.21	<0.21	<0.21	<0.22	3.8	2.5	2.7	2.5	2.4
Minimum Detection Limit		0.20	0.20	0.21	0.21	0.22	0.63	0.63	0.63	0.63	0.61

TABLE B-IX-2  
ANNUALLY AVERAGED AMBIENT AIR RADIOACTIVITY CONCENTRATION FOR EACH SAMPLING STATION

Sample Station	$\alpha(\text{pCi}/\text{m}^3)$					$\beta(\text{pCi}/\text{m}^3)$				
	1971	1972	1973	1974	1975	1971	1972	1973	1974	1975
AI/HQ Bldg 001 Roof	<0.0085	<0.0085	<0.0082	<0.0055	<0.0065	0.28	<0.12	<0.042	<0.16	<0.080
AI/HQ Bldg 004 Roof	<0.0089	<0.0086	<0.0068	<0.0057	<0.0061	<0.32	<0.16	<0.040	<0.17	<0.081
NDFL Bldg 009 Ground	<0.0087	<0.0087	<0.0066	<0.0055	<0.0061	<0.33	<0.15	<0.037	<0.16	<0.074
NDFL Bldg 011 Ground	<0.0086	<0.0086	<0.0076	<0.0058	<0.0057	<0.33	<0.13	<0.039	<0.16	<0.070
NDFL Bldg 012 Ground	<0.0085	<0.0086	<0.0065	<0.0058	<0.0064	<0.32	<0.12	<0.039	<0.16	<0.075
NDFL Bldg 040 Ground	<0.0087	<0.0087	<0.0076	<0.0057	<0.0059	<0.34	<0.14	<0.038	<0.16	<0.077
NDFL Bldg 074 Ground	<0.0087	<0.0085	<0.0066	<0.0056	<0.0061	0.33	<0.14	<0.037	<0.15	<0.072
NDFL Bldg 143 Ground	<0.0088	<0.0085	<0.0071	<0.0057	<0.0061	<0.33	<0.13	<0.039	<0.16	<0.075
NDFL Bldg 363 Ground	<0.0086	<0.0086	<0.0069	<0.0055	<0.0058	<0.33	<0.14	<0.038	0.16	<0.078
No. Samples Reported	3206	3138	3026	3140	3186	3206	3138	3026	3140	3186
Minimum Detection Limit	0.0085	0.0085	0.0054	0.0054	0.0056	0.018	0.018	0.012	0.012	0.012

TABLE B-IX-3  
ANNUALLY AVERAGED AMBIENT RADIATION DOSIMETRY DATA FOR EACH MONITORING STATION

Dosimeter Station	Average Dose Rate (mrem/hour)			Equivalent Annual Dose (mrem)		
	1973*	1974	1975	1973	1974	1975
TLD-1 AI/HQ	0.010	0.011	0.012	88	96	105
TLD-2 AI/HQ	0.013	0.010	0.010	114	88	88
TLD-3 AI/HQ	0.010	0.010	0.011	88	88	96
TLD-4 AI/HQ	0.010	0.010	0.012	88	88	105
TLD-5 AI/NDFL	0.010	0.010	0.011	88	88	96
TLD-6 AI/NDFL	0.010	0.013	0.014	88	114	123
TLD-7 AI/NDFL	0.012	0.012	0.013	105	105	114
TLD-8 AI/NDFL	0.012	0.014	0.013	105	123	114
TLD-9 AI/NDFL	0.010	0.010	0.010	88	88	88
TLD-10 AI/NDFL	0.012	0.013	0.011	105	114	96
TLD-11 Off-Site	0.011	0.013	0.010	96	114	88
TLD-12 Off-Site	0.012	0.012	0.012	105	105	105
TLD-13 Off-Site	0.010	0.010	0.010	88	88	88
Grand Average	0.011	0.011	0.011	96	100	100

\*Last quarter data only.

TABLE B-IX-4

## ANNUALLY AVERAGED BOTTOM SEDIMENT RADIOACTIVITY CONCENTRATION

Sample Station		Annual No. of Samples	$\alpha$ (pCi/gram)					$\beta$ (pCi/gram)				
			1971	1972	1973	1974	1975	1971	1972	1973	1974	1975
SV-54	Bell Creek Bed	12	0.36	0.32	0.34	0.32	0.29	23	22	24	22	22
SV-54	Bell Creek Vegetation <sup>†</sup>	12	<0.19 <sup>†</sup>	<0.12	<0.17	<0.16	<0.19	128	139	147	142	123
S-55	SSFL Pond Bed	12*					0.63 <sup>†</sup>					26 <sup>†</sup>
	Minimum Detection Limit		0.05	0.050	0.051	0.051	0.056	0.22	0.22	0.22	0.22	0.22

\*New station data are for last six months only

<sup>†</sup>pCi/gram - ashB-VII-IX-9  
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## X. ADDITIONAL ANALYSIS

There are no planned discharges of radioactive or nonradioactive pollutants into uncontrolled areas from either of AI's Southern California facilities. Additionally, monitoring of discharged wastewater as required by the NPDES Permit shows that there exists no potential for pollutant uptake into the food chain from these discharges. Therefore the requirement sample analysis from crop land, for humans, domestic animals, and fish is not applicable.

## XI. ESTIMATION OF 50-YEAR DOSE COMMITMENTS TO INDIVIDUALS FOR AIRBORNE RADIOLOGICAL POLLUTANTS

### A. INTRODUCTION

In the absence of any specific data for the selection of reasonable annual average  $\chi/Q$ 's (atmospheric dispersion factors) for either the NDFL or the Headquarters site, the 4-30 day values presented in Regulatory Guide 1.3 are used.<sup>(1)</sup> For annual average  $\chi/Q$  values, the most appropriate conservative approach is to use the 4-30 day curve for the atmospheric dispersion values. This curve is reproduced in Figure B-XI-1 (lowest curve). From potential sources at the NDFL, the doses are calculated at the distance of the nearest population group (~500 people) about 1950 meters NW of the site.\* On these bases, a  $\chi/Q$  value of  $4 \times 10^{-6}$  sec/m<sup>3</sup> would appear to be quite conservative for use as an average. From sources at the headquarters site, the potential dose is estimated at a distance of ~100 meters which represents the nearest approach of a facility boundary to an emission point (i. e. , "stack") and a  $\chi/Q \cong 8 \times 10^{-4}$  sec/m<sup>3</sup>.

Although the gross alpha and beta radioactivity concentrations and total quantities exiting from the stacks are measured, the exact constituents are normally much too low in concentration to identify directly. Therefore, it is necessary to infer from the operations taking place in the building what the constituents measured in the exhaust air may be. For example, if the principal activity is fabricating enriched uranium fuel elements, the alpha activity measured at the stack exit is presumed to be U<sup>235</sup>. If work with plutonium is the principal operation underway, then the measured activity is assumed to be Pu<sup>239</sup>. In most cases, such assumptions are overly conservative. On this basis, the calculation of  $\chi/Q$  proceeds as follows.

### B. HEADQUARTERS - BUILDING 001

The operations in Building 001 most significantly involve enriched uranium (U<sup>235</sup>) fuel element manufacture, and hence the most likely contaminant of interest will be assumed to be U<sup>235</sup>. As reported in Reference 3, the total airborne

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\*See Section A-VII-Demography (this report)

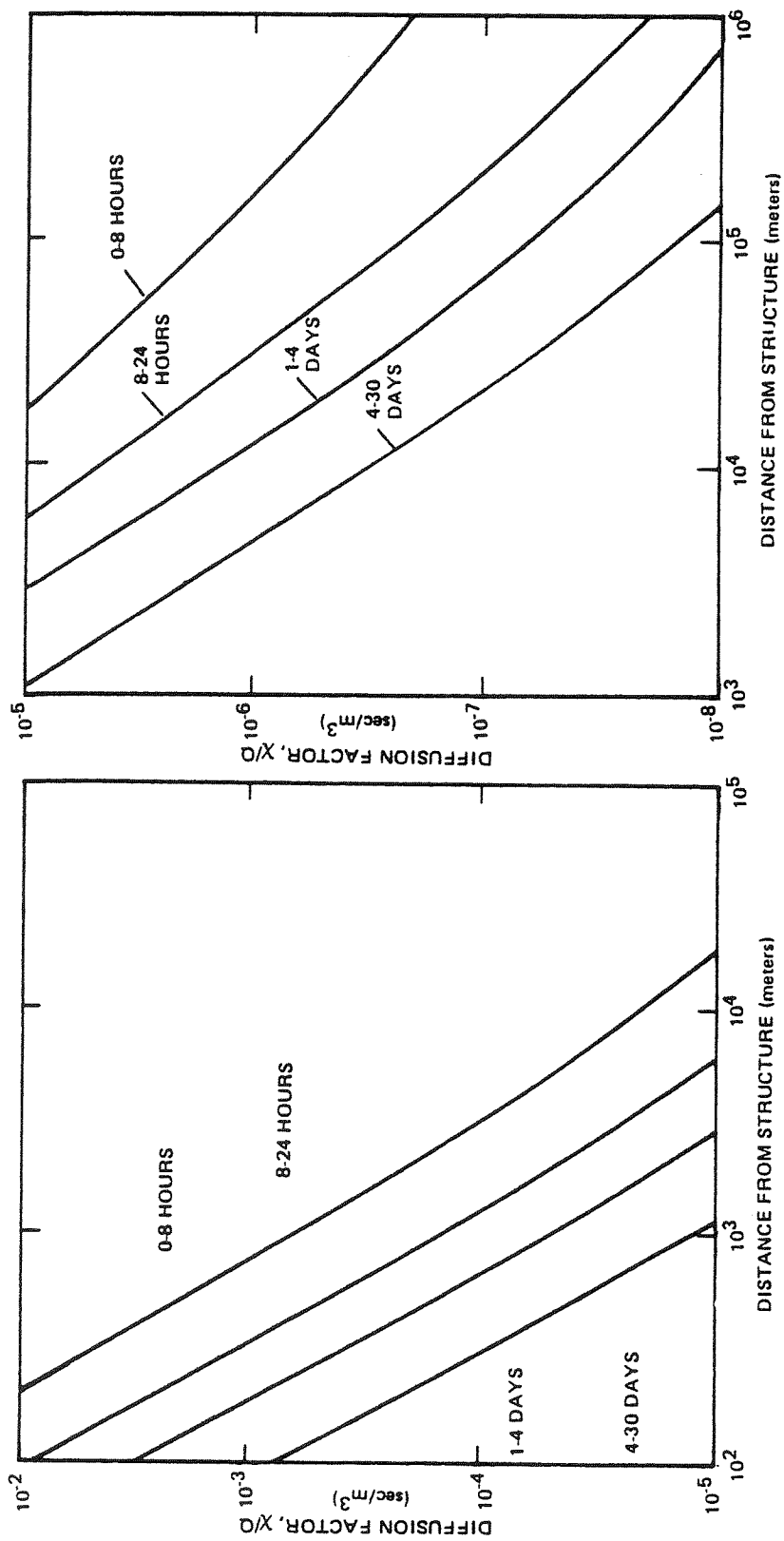


Figure B-XI-1. Assumed Atmospheric Diffusion Factors for Various Times Following Accident

radioactivity released from Building 001 during 1975\* was  $\sim 3.7 \times 10^{-6}$  Ci ( $\alpha$ ) and  $\sim 2.6 \times 10^{-6}$  Ci ( $\beta$ ). Since the operations of interest involve enriched uranium, the alpha value is more pertinent. On the basis of the closest point of public access ( $\sim 100$  meters) and assuming that the wind blew in that direction during the entire period of release and that an individual was located at this point during the entire release, the dose commitment would be: dose (commitment) = atmospheric dispersion factor x quantity released x breathing rate x dose per unit activity inhaled.

$$D = 8 \times 10^{-4} \text{ sec/m}^3 \times 3.7 \times 10^{-6} \text{ Ci/yr} \times 3.5 \times 10^{-4} \text{ m}^3/\text{sec} \\ \times 5.7 \times 10^7 \text{ rem/Ci inhaled}^{(4)\dagger} = 5.9 \times 10^{-5} \text{ rem/yr}$$

The annual ambient radiation dose levels in and around the San Fernando valley have been measured<sup>(3)</sup> and average about  $100 \times 10^{-3}$  rem/yr. Comparison with the above dose of  $5.9 \times 10^{-5}$  rem/yr shows that it is less than 0.06% of background and can properly be regarded as negligible.

#### C. HEADQUARTERS - BUILDING 004

The potential radioactive contaminants in the effluents from Building 004 operations also principally involve enriched uranium aerosols and hence, the most significant contaminant of interest will be assumed to be  $\text{U}^{235}$ . As reported in Reference 3, the total radioactivity released from Building 004 during 1975 was  $< 5.4 \times 10^{-6}$  Ci ( $\alpha$ ) and  $< 1.2 \times 10^{-5}$  Ci ( $\beta$ ). Since the operations involve enriched uranium, the alpha value is more pertinent. On the basis of the closest point of public access ( $\sim 100$  meters) and assuming that the wind blew in that direction during the entire period of release and that an individual was located at this point during the entire release, the dose commitment would be:

$$D = 8 \times 10^{-4} \text{ sec/m}^3 \times 5.4 \times 10^{-6} \text{ Ci/yr} \times 3.5 \times 10^{-4} \text{ m}^3/\text{sec} \\ \times 5.7 \times 10^7 \text{ rem/Ci inhaled}^{(4)*} = 8.6 \times 10^{-5} \text{ rem/yr}$$

\*The data presented are the most recent available (1975), but those for previous years are comparable and available in published documents.

†Assuming insoluble uranium and therefore taking the lungs as the critical organ.

The total dose commitment at the boundary of the AI headquarters site will be less than the sum of the dose commitments from Buildings 001 and 004 (because the locations of the maximum  $\chi/Q$  for the two buildings do not coincide). This value is less than 0.09% of the ambient radiation level of  $100 \times 10^{-3}$  rem/yr and can also be properly regarded as negligible.

#### D. AIHL - BUILDING 020 (NDFL)

The operations in Building 020 currently involve the preparation of SRE fuel for reprocessing. Hence, the potential contaminants include  $U^{234}$ ,  $U^{236}$ ,  $U^{235}$ ,  $U^{238}$ , thorium and  $Cs^{137}$  and mixed fission products (e.g.,  $Sr^{90}$ - $Y^{90}$ ,  $Cs^{137}$ ,  $Pm^{147}$ ,  $Kr^{85}$ , etc.). With the impracticality of specific isotopic identification in the effluents, it is conservatively assumed for the purpose of these calculations that all of the  $\alpha$  activity/measured ( $1.5 \times 10^{-7}$  Ci)\* was  $Pu^{239}$  and all of the  $\beta$  activity measured ( $6.7 \times 10^{-3}$  Ci)\* was  $Sr^{90}$ . On this basis, and further assuming the conservative meteorological diffusion parameters discussed previously ( $4 \times 10^{-6}$  sec/m<sup>3</sup>) and constant wind direction toward the nearest point of public access and continuous occupancy of this point, the potential dose was:

$$D_{\alpha}(Pu^{239}) = 4 \times 10^{-6} \text{ sec/m}^3 \times 1.5 \times 10^{-7} \text{ Ci/yr} \times 3.5 \times 10^{-4} \text{ m}^3/\text{sec}$$

$$\times 6.6 \times 10^9 \text{ rem (bone)/Ci inhaled} = 1.4 \times 10^{-6} \text{ rem/yr}$$

$$= 1.4 \times 10^{-3} \text{ mrem/yr}$$

$$D_{\beta}(Sr^{90}) = 4 \times 10^{-6} \text{ sec/m}^3 \times 6.7 \times 10^{-3} \text{ Ci/yr} \times 3.5 \times 10^{-4} \text{ m}^3/\text{sec}$$

$$\times 1.1 \times 10^7 \text{ rem (bone)/Ci inhaled} = 1.0 \times 10^{-4} \text{ rem/yr}$$

This value is less than 0.1% of the ambient radiation level and similarly can properly be considered as negligible in comparison.

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\*Assuming insoluble uranium and therefore taking the lungs as the critical organ.

#### E. NMDF - BUILDING 055 (NDFL)

The operations in Building 055 involve the fabrication of plutonium and uranium-plutonium fuel pins for irradiation testing. Hence, the most hazardous potential contaminant is  $\text{Pu}^{239}$ . Again, with the lack of specific identification of the isotopic constituents measured in the effluents, the alpha activity ( $1.9 \times 10^{-7}$  Ci) is assumed to be composed entirely of  $\text{Pu}^{239}$ . On this basis, and assuming the conservative meteorologic diffusion parameters discussed previously ( $4 \times 10^{-6} \text{ sec/m}^3$ ) with constant wind direction toward the nearest point of public access and continuous occupancy of this point, the potential dose would be:

$$D_{\alpha} = 4 \times 10^{-6} \text{ sec/m}^3 \times 1.9 \times 10^{-7} \text{ Ci/yr} \times 3.5 \times 10^{-4} \text{ m}^3/\text{sec} \\ \times 6.6 \times 10^9 \text{ rem (bone)/Ci inhaled} = 1.8 \times 10^{-6} \text{ rem/yr}$$

This value is less than 0.002% of the ambient radiation level and is again negligible in comparison.

#### F. BUILDING 100 (NDFL)

Because of the current utilization of Building 100, atmospheric contaminants are not generated or released. Therefore, the building ventilation is not sampled. Releases of airborne contaminants are essentially zero.

## XII. COMPARISON OF CONCENTRATIONS OF NONRADIOLOGICAL POLLUTANTS

### A. HEADQUARTERS COMPLEX

The Los Angeles Bureau of Sanitation has, under Section 64.30(d) of the Los Angeles Municipal Code, established limits for various pollutants which can be discharged into the sanitary sewer system. Table B-XII-1 lists a comparison of the Atomics International sanitary sewer discharges for three-quarterly periods during 1975, for comparison with limits on these pollutants as established by the Bureau of Sanitation.

TABLE B-XII-1  
RESULTS OF ANALYSIS FOR POLLUTANTS  
AT HEADQUARTERS

Constituent	Units	Limits	Sample Analysis		
			4-1-75	7-1-75	10-1-75
pH	pH Units	5.5-11.0	8.2	8.1	7.4
Specific Conductance	mohs/cm	*	424.0	642.0	715.0
Chemical Oxygen Demand	mg/l	*	238.0	333.0	745.0
Biological Oxygen Demand	mg/l	*	96.0	97.0	369.0
Suspended Solids	mg/l	1,000.0	70.0	111.0	107.0
Arsenic	mg/l	*	0.01	0.01	0.01
Cyanide	mg/l	2.0	0.005	0.005	0.005
Phenols	mg/l	*	0.1	0.05	0.70
Oil and Grease	mg/l	600.0	12.6	20.2	53.0
Chlorinated Hydrocarbons	mg/l	0	0.01	0.01	0.001
Cadmium	mg/l	5.0	0.001	0.002	0.0003
Lead	mg/l	*	0.005	0.002	0.0006
Mercury	mg/l	0	0.0001	0.003	0.0022
Copper	mg/l	*	0.015	0.035	0.070

\*Limits not established - analysis requested by Bureau of Sanitation

B. NDFL

The NPDES permit, No. CA0001309, issued to Rockwell International Corporation for the discharge of water from the Santa Susana field laboratories, contains constituent limits as a part of the approved permit. Table B-XII-2 lists these limits and sample analyses for specific discharge of water to Bell Canyon during CFY 1975.

TABLE B-XII-2  
RESULTS OF ANALYSIS FOR POLLUTANTS AT NDFL

Constituent	Units	Limits	Sample Analysis		
			4-3-75	4-3-75	6-6-75
pH	pH units	6.5-9.0	8.7	8.4	9.2
Total Dissolved Solids	mg/l	1,000.0	510.0	3.55	380.0
Suspended Solids	mg/l	45.0	8.0	8.0	19.0
Biological Oxygen Demand	mg/l	30.0	0	0	10.0
Oil and Grease	mg/l	15.0	17.0	19.0	6.0
Turbidity	TU	75.0	20.0	15.0	24.0
Color	Color units	20.0	40.0	4.0	23.0
Total Hardness (CaCO <sub>3</sub> )	mg/l	500.0	142.0	100.0	157.0
Chloride	mg/l	250.0	48.0	48.0	71.0
Sulfate	mg/l	0.2	-	-	79.0
Settleable Solids	mg/l	10.0	trace	trace	trace
Nitrate Nitrogen	mg/l	10.0	1.84	1.11	0.1
Total Chromium	mg/l	0.01	0	0	0
Fluoride	mg/l	1.0	0.38	0.46	0.34
Boron	mg/l	1.0	0	0	0
Residual Chlorine	mg/l	0.5	-	-	0
Surfactants (MBAS)	mg/l	0.5	0.09	0.01	0.3
Temperature	°F	100°	50°	49°	80°

### XIII. ENVIRONMENTAL MONITORING PROGRAM

#### A. INTRODUCTION

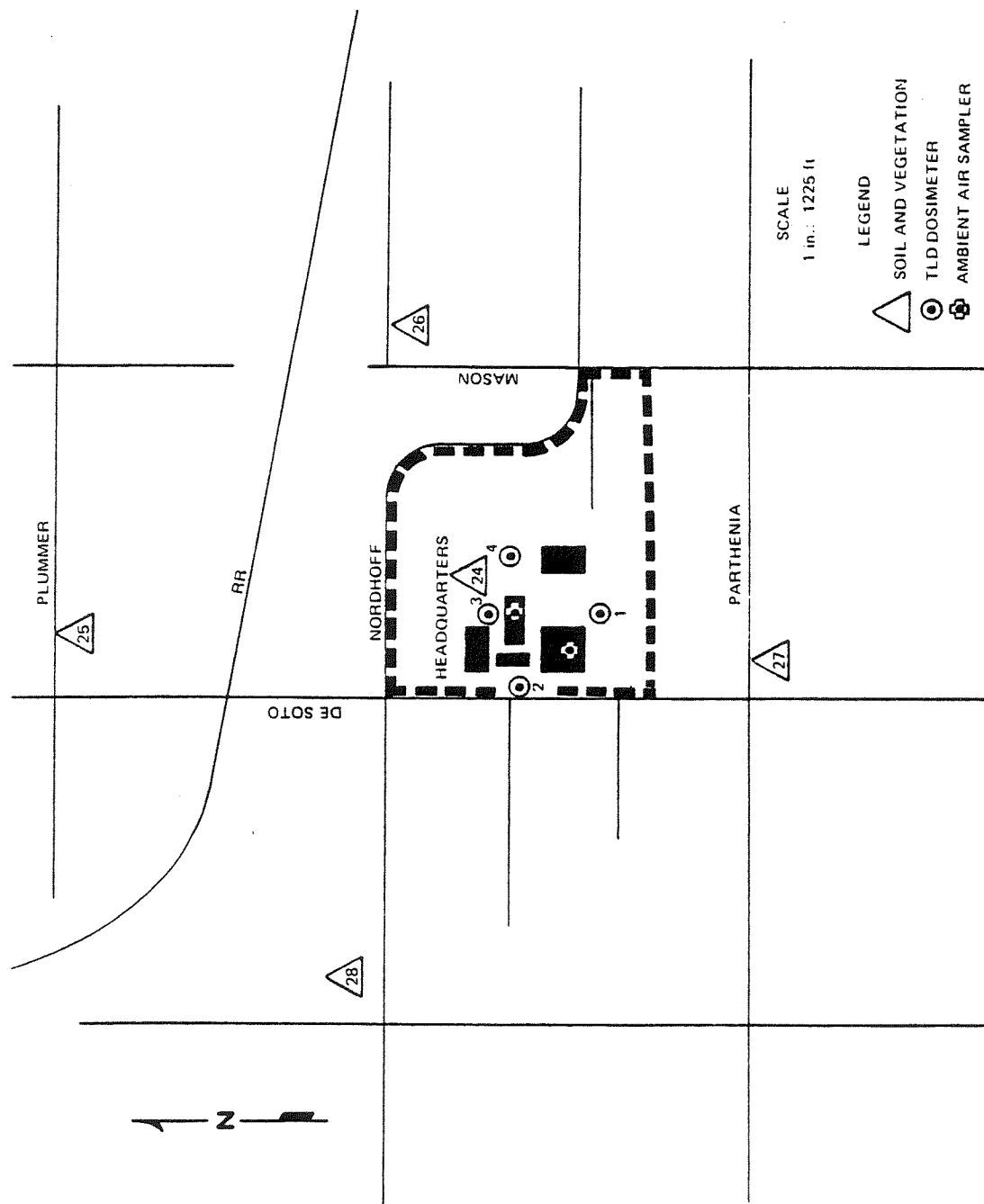
Environmental and facility effluent monitoring at Atomics International is performed by the Radiation and Nuclear Safety Unit of the Health, Safety, and Radiation Services Department. Soil, vegetation, and surface water are routinely sampled up to a distance of 10 miles from Atomics International sites. Continuous ambient air sampling and thermoluminescent dosimetry are performed on-site for monitoring airborne radioactivity and site ambient radiation level. Radioactivity in effluents discharged to the atmosphere from AI facilities is continuously sampled and monitored. A summary description of the environmental monitoring program is presented below, while a more detailed description may be found in Reference 3.

##### 1. General Philosophy

The basic policy for the control of radiological and toxicological hazards at AI requires that adequate containment of such materials be provided and, through rigid operational controls, that effluent releases and external radiation levels are reduced to a minimum. The environmental monitoring program provides a measure of the effectiveness of the Division's safety procedures and engineering safeguards incorporated into facility designs. Specific radionuclides in facility effluents or environmental samples, although not routinely identified due to extremely low radioactivity levels normally detected, may be identified by analytical or radiochemistry techniques if significantly increased radioactivity levels were observed.

##### 2. Sampling Location Points and Frequency of Sampling

Environmental sampling stations that are located within the boundaries of AI sites are referred to as "on-site" stations; those located within a 10-mile radius of the sites are referred to as "off-site" stations. The on-site sampling locations are shown in Figure B-XIII-1 for the Headquarters complex and in Figure B-XIII-2 for the Field Test Laboratory. Figure B-XIII-3 presents a map locating the off-site sampling locations. The specific locations of all the sampling points are tabulated in Table B-XIII-1.



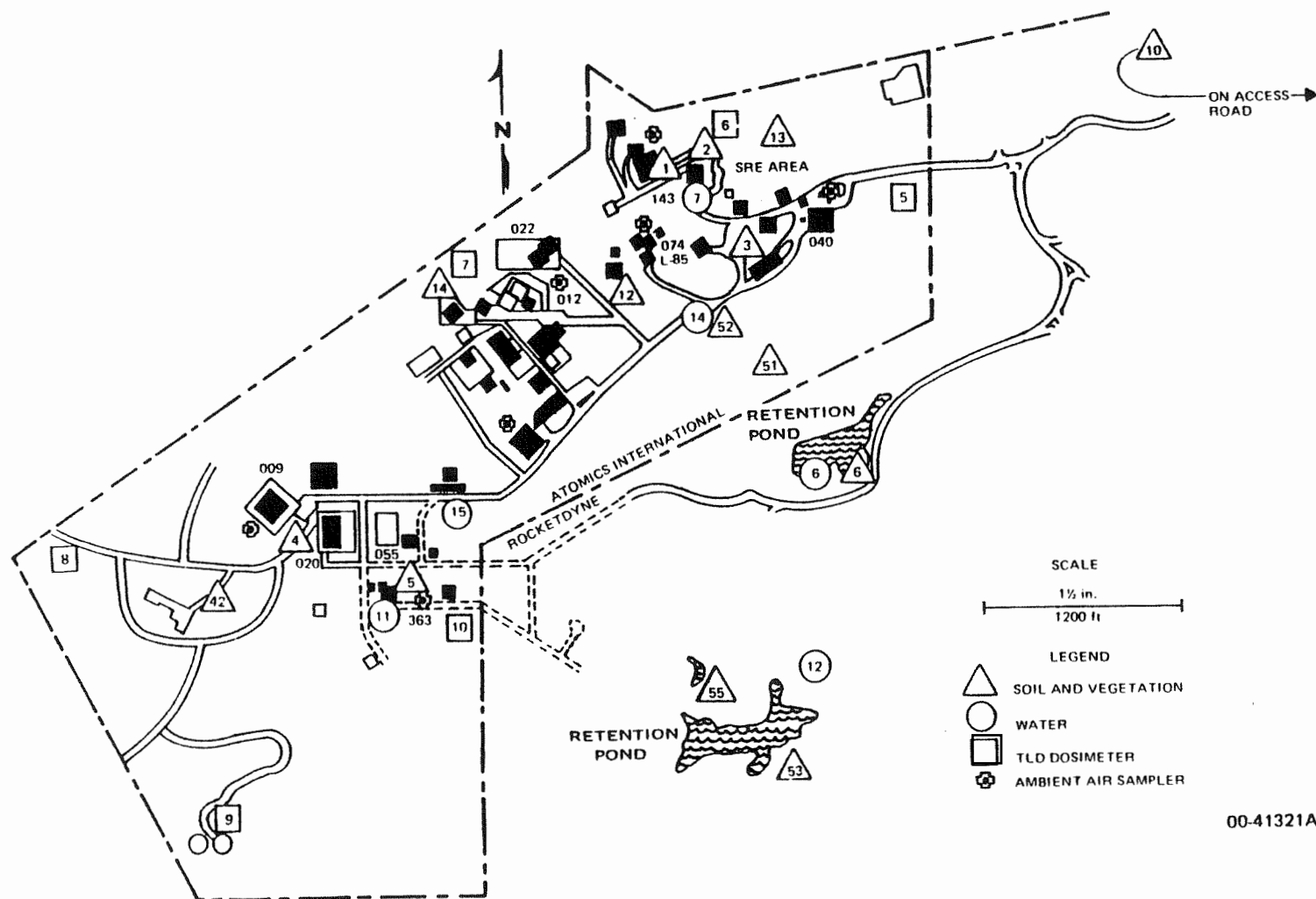
00-41320

Figure B-XIII-1. Map of Headquarters Vicinity Sampling Stations

AI-76-21

B-XIII-2

AI-76-21  
B-XIII-3



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Figure B-XIII-2. Map of NDFL Sampling Stations

AI-76-21  
B-XIII-4

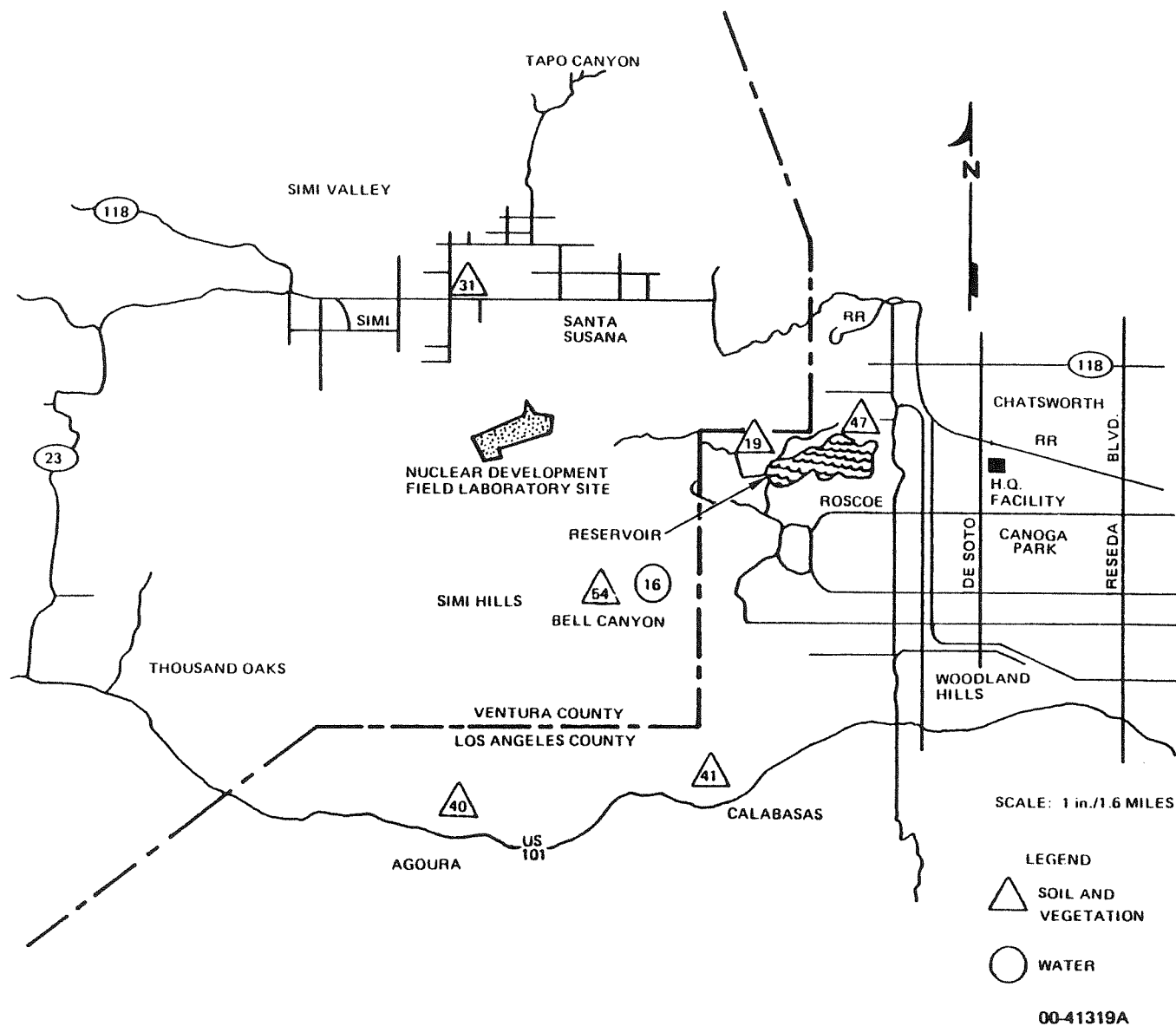


Figure B-XIII-3. Map of Canoga Park, Simi Valley, Agoura and Calabasas Sampling Stations

TABLE B-XIII-1  
SAMPLE STATION LOCATIONS  
(Sheet 1 of 2)

Station	Location
SV-1	SRE Reactor, NDFL
SV-2	SRE Perimeter Drainage Ditch, NDFL
SV-3	Building 064 Parking Lot, NDFL
SV-4	Building 020, NDFL
SV-5	Building 363, NDFL
SV-6	Rocketdyne Retention Pond, SSFL
SV-10	Santa Susana Site Access Road
SV-12	L-85 Reactor, NDFL
SV-13	Sodium Cleaning Pad, NDFL
SV-14	Below Building 022, NDFL
SV-19	Santa Susana Site Entrance, Woolsey Canyon
SV-24	Atomics International Headquarters
SV-25	De Soto Avenue and Plummer Street
SV-26	Mason Avenue and Nordhoff Street
SV-27	De Soto Avenue and Parthenia Street
SV-28	Canoga Avenue and Nordhoff Street
SV-31	Simi Valley, Alamo Avenue and Sycamore Road
SV-40	Agoura - Kanan Road and Ventura Freeway
SV-41	Calabasas - Parkway Calabasas and Ventura Freeway
SV-42	Nonradioactive Materials Disposal Area, NDFL
SV-47	Chatsworth Reservoir North Boundary
SV-51	Building 029, NDFL
SV-52	Burro Flat Drainage Control Pond, G Street and 17th Street, NDFL
SV-53	Top of Bell Canyon Below Rocketdyne Delta Pond Spillway, SSFL
SV-54	Bell Creek
SV-55	Rocketdyne Retention Pond, SSFL
W-6	Rocketdyne Retention Pond, SSFL
W-7	Process Water from Building 003, NDFL

SV - Soil and Vegetation Sample Station  
S - Soil Sample Station  
W - Water Sample Station

TABLE B-XIII-1  
SAMPLE STATION LOCATIONS  
(Sheet 2 of 2)

Station	Location
W-11	Process Water from Building 363, NDFL
W-12	Rocketdyne Retention Pond, SSFL
W-16	Bell Creek
A-1	Atomics International Headquarters, Building 001 Roof
A-2	Atomics International Headquarters, Building 004 Roof
A-3	Building 009, NDFL, Grade Level, West Side
A-4	Building 011, NDFL, Grade Level, West Side
A-5	Building 012, NDFL, Grade Level, West Side
A-6	Building 040, NDFL, Grade Level, North Side
A-7	Building 074, NDFL, Grade Level, South Side
A-8	Building 143, NDFL, Grade Level, North Side
A-9	Building 363, NDFL, Grade Level, South Side
TLD-1	Atomics International Headquarters, South of Building 102 on Fence
TLD-2	Atomics International Headquarters, West of Building 001 on Gate to Plant Water Supply Enclosure
TLD-3	Atomics International Headquarters, Guard Post No. 1, Building 201
TLD-4	Atomics International Headquarters, East Fence Gate
TLD-5	Building 113, NDFL
TLD-6	SRE Retention Pond, NDFL
TLD-7	Electric Substation No. 719, NDFL
TLD-8	Property Line Gate, West End of H Street, NDFL
TLD-9	Water Tank No. 701, NDFL
TLD-10	Building 854, NDFL
TLD-11	Off-Site, Northridge
TLD-12	Off-Site, Simi Valley
TLD-13	Off-Site, Northridge

W - Water Sample Station

A - Air Sample Station

TLD - Thermoluminescent Dosimeter Location

The on-site environs of the Headquarters and NDFL facilities are sampled monthly, to determine the concentration of radioactivity in typical surface soil, vegetation, and water. Similar off-site environmental samples are obtained quarterly. Continuously performed on-site ambient air sampling provides information concerning airborne long-lived particulate radioactivity. A site ambient gamma radiation monitoring program, utilizing thermoluminescent dosimetry (TLD) was initiated in 1971.

### 3. Liquid Waste Disposal

Nonradioactive wastes released to unrestricted areas are limited to liquids released to sanitary sewage systems and to surface water drainage systems. No intentional releases of liquid pollutants are made to unrestricted areas. Liquid waste generated at the Headquarters site is discharged into the city sewage system. Sanitary sewage from all ERDA and AI facilities at the NDFL is treated at an on-site sewage plant. The plant effluent drains into a retention pond, located at the adjoining Rocketdyne Division Santa Susana Field Laboratory (SSFL). The surface water drainage system of the NDFL is composed of catch ponds and open drainage ditches leading to the retention pond that also receives the sewage plant effluent. Water from the pond may be reclaimed as industrial process water, or it may be released off-site into Bell Creek, a tributary of the Los Angeles River. The pond is also monitored for nonradioactive pollutants by Rocketdyne, as required by discharge permits issued to Rocketdyne by the California Regional Water Quality Control Board.

### 4. Sampling and Sample Preparation

#### a. Soil

Soil is analyzed for radioactivity to monitor for any significant increase in radioactive deposition. Since soil is naturally radioactive and has been contaminated by atmospheric testing of nuclear weapons, a general background level of radioactivity exists. The data are monitored for increases beyond the natural variability of this background.

Surface soil types available for sampling range from decomposed granite to clay and loam. Samples are taken from the top 1/2-in. layer of undisturbed ground surface. The soil samples are packaged in plastic containers, and returned to the laboratory for analysis. Sample preparation consists of

transferring the soil to Pyrex beakers, and drying in a muffle furnace at approximately 500°C for 8 hours. After cooling, the soil is sieved to obtain a uniform particle size. Two-gram aliquots of the sieved soil are weighed and transferred to copper planchets. The soil is wetted in the planchet with alcohol, evenly distributed to obtain uniform sample thickness, dried, and counted for both alpha and beta radiation. Loose soil specific gravity ranges from approximately 1.1 to 1.4 gm/ml, and averages 1.2 gm/ml.

b. Vegetation

The analysis of vegetation is performed as an adjunct to the soil analysis and is done to determine the uptake of radioactivity by plants. These plants do not contribute to the human food chain, nor is there significant agriculture or grazing in the immediate neighborhood of either site.

Vegetation samples obtained in the field are of the same perennial plant types, wherever possible; these are usually sunflower or wild tobacco leaves. Vegetation leaves are stripped from plants, and placed in paper cartons for transfer to the laboratory for analysis. Ordinarily, plant root systems are not analyzed.

Vegetation samples are first washed with tap water to remove foreign matter, and then thoroughly rinsed with distilled water. Washed vegetation is dried in tared beakers at 100°C for 24 hr for dry weight determination, then ashed in a muffle furnace at approximately 500°C for 8 hr, producing a completely burned ash. One-gram aliquots of pulverized ash from each beaker are weighed, and transferred to copper planchets. The vegetation ash is wetted in the planchet with alcohol, evenly distributed to obtain uniform sample thickness, dried, and counted for alpha and beta radiation. The dry/ash weight ratio is used for the determination of the equivalent dry weight gross radioactivity concentration value.

c. Water

Surface water samples are obtained monthly at the NDFL and from Bell Creek. The water is drawn into 1-liter polyethylene bottles, and transferred to the laboratory.

Five-hundred milliliter volumes of water are evaporated to dryness in crystallizing dishes at approximately 90°C. The residual salts are redissolved in distilled water, transferred to copper planchets, dried under heat lamps, and counted for alpha and beta radiation.

d. Ambient Air

Air sampling is performed continuously at the Headquarters and NDFL sites with automatic air samplers, operating on 24-hr sampling cycles. Airborne particulate radioactivity is collected on Type HV-70 filter media, which are automatically changed daily at the end of each sampling period. The samples are counted for alpha and beta radiation following a minimum 120-hr decay period to allow the decay of naturally occurring radon particulate daughters. The volume of a typical daily ambient air sample is approximately 25 m<sup>3</sup>.

5. Counting and Calibration

Environmental soil, vegetation, water, and ambient air samples are counted for alpha and beta radiation with a low-background gas flow proportional counting system, capable of the simultaneous counting of both alpha and met beta radiation. The sample-detector configuration provides a nearly 2 $\pi$  geometry. The thin-window detector is continually purged with methane counting gas. A preset time mode of operation is used for all samples. The minimum detection limits shown in Table B-XIII-2 were determined by using typical values for counting time, system efficiencies for detecting alpha and beta radiation, background count rates (approximately 0.05 cpm  $\alpha$  and 1.0 cpm  $\beta$  and sample size. For the table, the minimum statistically significant amount of radioactivity, irrespective of sample configuration, is taken as that amount equal in count rate to three times the standard deviation of the system background count rate.

Counting system efficiencies are determined routinely with Ra-D+E+F (with alpha absorber), Cl<sup>36</sup>, Th<sup>230</sup>, U<sup>235</sup>, and Pu<sup>239</sup> standard sources, and with K<sup>40</sup>, in the form of standard reagent grade KCl, which is used to simulate soil and vegetation samples. Self-absorption standards are made by dividing sieved KCl into samples, increasing in mass by 200 mg increments, from 100 to 3000 mg. The samples are placed in copper planchets, of the type used for environmental samples, and counted. The ratio of sample activity to the observed net count rate for each sample is plotted as a function of sample weight. The

TABLE B-XIII-2  
MINIMUM RADIOACTIVITY DETECTION LIMITS (MDL)

Sample	Activity	Minimum Detection Limits*
Soil	$\alpha$	$(5.6 \pm 6.7) 10^{-8} \mu\text{Ci/gm}$
	$\beta$	$(2.2 \pm 2.2) 10^{-7} \mu\text{Ci/gm}$
Vegetation	$\alpha$	$(1.0 \pm 1.3) 10^{-7} \mu\text{Ci/gm ash}$
	$\beta$	$(3.5 \pm 3.5) 10^{-7} \mu\text{Ci/gm ash}$
Water	$\alpha$	$(2.2 \pm 2.7) 10^{-10} \mu\text{Ci/ml}$
	$\beta$	$(6.1 \pm 6.0) 10^{-10} \mu\text{Ci/ml}$
Air	$\alpha$	$(5.6 \pm 6.6) 10^{-15} \mu\text{Ci/ml}$
	$\beta$	$(1.2 \pm 1.2) 10^{-14} \mu\text{Ci/ml}$

\*95% Confidence Level

correction factor (ratio) corresponding to sample weight may be obtained from the graph. The product of the correction factor and the net sample count rate yields the sample activity (dpm). This method has been proven usable by applying it to various-sized aliquots of uniformly mixed environmental samples and observed that the resultant specific activities fall within the expected statistical counting error.

Since the observed radioactivity in environmental samples results primarily from natural and weapons-testing sources, and is at such low concentrations, an effort is not made to identify individual radionuclides. The detection of significant levels of radioactivity would lead to an investigation of the radioactive material involved, the sources and possible causes.

#### 6. Nonradioactive Materials

Rockwell International Corporation, Rocketdyne Division, has filed a Report of Waste Discharge with the California Regional Water Quality Control Board, and has been granted a National Pollutant Discharge Elimination System permit to discharge wastewater, pursuant to Section 402 of the Federal Water Pollution Control Act. The permit, NPDES No. CA0001309, became effective on December 6, 1974, and supersedes all previously held permits for wastewater discharge from the Rocketdyne Division, SSFL. Discharge of up to 3,500,000 gal/day

of overflow is permitted into Bell Creek from water reclamation retention ponds. Discharge generally occurs only during and immediately after periods of heavy rainfall or during extended periods of rocket engine testing.

Only one of the retention ponds receives influent from the AI NDFL. It is identified as W-12 in Table B-XIII-1. The influent includes sewage treatment plant effluent and surface runoff water. Grab-type water samples, taken at the retention pond prior to a discharge, are analyzed by a California State certified analytical testing laboratory. The specific constituents analyzed for, and their respective limitations in discharged wastewater, are presented in Appendix B. Wastewater originating from facilities located throughout the Santa Susana site are composited in the retention pond. Therefore, the point of origin of non-radioactive constituents found in wastewater is impossible to determine.

## XIV. IDENTIFICATION OF ACCIDENTS THAT MIGHT HAVE OFF-SITE EFFECTS

### A. INTRODUCTION

#### 1. Selection of Accidents

The accidents chosen for analysis are based upon a review of operations in facilities where significant quantities of nuclear material are handled under the SNM license. The criterion for selection was maximum impact on the environment rather than maximum probability of occurrence. Thus while the accidents considered are not highly credible, they do represent the maximum release of radioactive contaminants to the environment. Other accidents, which would be considered more likely, would not, in general, involve any nuclear materials.

The facilities at AI are engineered on the basis of accident prevention. Where potential accidents are recognized, hazards are eliminated or minimized. Thus, for example, pyrophoric fuel materials are handled in an inert atmosphere. In addition to the engineered safeguards, there are also strict administrative controls on nuclear materials and moderating materials where applicable. Therefore, any occurrence of accident which would result in the release of radioactive contaminants is considered as highly unlikely.

### B. OPERATIONS AT HEADQUARTERS FACILITY

#### 1. Summary

The Fuel Fabrication Facility in Building 001 at Headquarters in Canoga Park is currently set up for the fabrication of fuel elements for EBR-II and ATR. The EBR-II fuel element contains a uranium-fissium alloy fuel pin sodium-bonded to a stainless steel jacket. The raw-stock uranium is received in the form of 5-inch diameter by 1/2-inch thick buttons. These buttons are scribed so that they may be broken into four unequal segments. The segments are weighed and then alloyed with the correct amount of fissium in a sealed induction furnace. Ingots of uranium-fissium alloy are then injection cast into fuel pins in another induction furnace. The fuel pins are inspected and inserted, with controlled amounts of sodium, into the stainless steel jackets. The open end of the jacket is then sealed by welding.

The ATR fuel elements are fabricated in a separate section in Building 001. The uranium is received in the form of broken buttons similar to the EBR-II fuel. This uranium is alloyed with aluminum in an arc melt furnace, and the  $UAl_x$  alloy produced is crushed into a fine powder. This powder is pressed into a compact which is placed in an aluminum picture frame, vacuum annealed and assembled into preformed aluminum cover plates. These assemblies are then hot rolled, to obtain a 12:1 reduction in thickness, inspected, and cut to size by removing only excess aluminum picture frame and corresponding cover plate material. These fuel plates are then formed and assembled into fuel elements.

## 2. Nuclear Safety

The fabrication of EBR-II and ATR fuel elements utilizes batch rather than continuous processing. Since a relatively small amount of fuel is being fabricated for research reactors, this does not limit the efficiency or economics of the operations and it provides for better control over the amount of fissile materials being handled at any work station. Criticality control limits are determined on the basis of the double contingency rule, requiring at least two unlikely events to occur before a nuclear accident is possible. In most cases, this means that mass or geometry of the batch is controlled so that it is no more than 45% of critical under conditions of full water reflection and optimum moderation. Work station limits are established at or below the criticality control limits, as required by the manufacturing process.

Transfer of material between work stations is made using safe geometry carts. These are designed so that the geometry of the fuel containers being handled is <45% of critical under conditions of full water moderation and reflection.

Strict accounting procedures are followed during all phases of handling of the fissile materials. Records are kept at each work station to assure that the posted limits are not exceeded. Fissile materials are stored in the Special Nuclear Materials (SNM) Vault and the maximum amount of material allowed out of the vault for processing is also limited. Quantities in each criticality control area are controlled and transfers between areas are monitored.

### 3. Fire Protection

AI maintains a Protective Services Department comprised of patrolmen and firemen. Although given separate job classifications, these receive identical training and would be available for any emergency. Each person receives extensive training prior to assignment. In addition, on the job training is provided as deemed necessary by the supervisory personnel.

Regular fire fighting units are provided by the Los Angeles City Fire Department, of which three different companies are within five minutes drive of the Headquarters facility. Additional fire and protective personnel are available from the Rocketdyne Division of Rockwell International, which is also located in Canoga Park. Rocketdyne personnel receive the same fireground training as do AI personnel.

The building is generally equipped with automatic sprinkler protection, with the exception of the SNM vault. The sprinkler system is tied into an automatic alarm system which relays alarm signals to the Protective Services Control Center. The Control Center is manned and operated on a 24-hour basis. All areas are surveyed on fixed frequency by Nuclear Energy Liability Property Insurance Agency in accordance with acceptable sound fire protection engineering practices.

In high hazard storage areas, automatic fire detector systems are provided in addition to sprinkler protection to ensure prompt alarms in the event of a fire. In certain areas, such as the vault, only an automatic fire detector system may be used for alarm purposes in conjunction with a manually controlled automatic sprinkler system.

According to rigidly enforced criticality safeguards and control procedures, nuclear fuel is stored under conditions which would be safe even with water reflection and moderation. Therefore, the use of sprinklers as described above is permissible in all areas from the viewpoint of nuclear safety.

Sprinkler heads are blocked off in areas containing alkali metals, and an automatic fire detector device is installed for purposes of alarm to the Control Center.

The fuel fabrication area is enclosed using double wall construction and is separated from other laboratory and manufacturing areas in Building 001 by corridors. These areas do not contain any large quantities of combustible materials and are covered with automatic sprinkler systems. An office area is located directly above the fabrication area but this is separated by a poured concrete floor. Thus, the possibility of a fire originating elsewhere in Building 001 and causing serious damage to the fabrication facility is remote.

a. Flammable Material at the Facility

The use of flammable materials within the fuel fabrication area is carefully controlled. Fuel materials are generally stored in metal containers, although some small samples may be kept in heavy-duty plastic bottles. Organic cleaning compounds are maintained in limited quantities due to the moderating/reflecting properties of hydrogenous liquids. Paper is used as necessary for maintaining required records and documentation. Most of the clerical work in support of fuel fabrication, however, is performed outside of the fabrication facility. There are some office spaces walled off from the work areas which contain wooden desks. However, benches in the work area are constructed of metal. Lab coats and protective plastic shoe covers are provided at the entrance to the contamination areas. Contaminated combustible materials are stored in the SNM Storage Vault in sealed steel drums. These include smears, cleaning materials from contamination areas, and waste material.

Sodium is used during the fabrication of EBR-II fuel elements. Small amounts of solid sodium are handled at room temperature in an inerted glovebox. The sodium does not present a fire hazard in the event of an air leak into the glovebox due to the rapid formation of a protective oxide layer. Premeasured lengths of sodium wire are inserted in stainless steel fuel pin cladding and melted in a settling furnace. A fuel pin is then inserted into the tube and it is allowed to cool. Leakage of air into the furnace would not create a problem since combustion could not be supported due to the rapid depletion of oxygen in the small annulus above the sodium.

Dry metallic uranium is used during the fabrication of both ATR and EBR-II fuel elements. Although the metal can be pyrophoric, it is most generally used in massive form and maintained at room temperature. No machining operations

are currently performed on the metal or its alloys. Melting of the virgin metal to form alloys is performed in an inert atmosphere isolated from any sources of water. Uranium aluminide ( $UAl_x$ ) must be crushed into a powder during the fabrication of ATR fuel elements. Since the metal powder can be pyrophoric at room temperature, it is handled in an inert atmosphere and powder, not being processed, is stored in sealed containers.

Electrical wiring or machinery used in fuel fabrication could provide a source of ignition for a fire in the fuel fabrication area. However, such fires would be limited due to the limited quantities of flammable materials and the automatic sprinkler system. The SNM vault has detectors which close the vents to the air supply and triggers an alarm in the Control Center in the event of a fire. Sprinklers within the vault can be turned on manually.

#### 4. Trivial Incidents

A review of the fuel fabrication facility has been performed examining the effects of incidents which might be expected to occur during the lifetime of the plant. Minor spills during the handling of powdered metals or during wet chemical analysis would be confined to the glovebox or fumehood where the work is being performed. The HEPA filters would provide confinement if any of the contaminants became airborne and entered the exhaust system. There would be no release to the environment. The loss of power would not compromise any of the equipment such that it would result in a situation where contaminants could be released to the atmosphere. A failure in the ventilation system would not adversely affect any of the operations and the filter bank would remain operational to provide confinement.

#### 5. Small Environmental Release

EBR-II uranium samples are obtained for chemical analysis by generating turnings from a piece of the uranium in a drill press. Freon is used as a coolant during drilling operations and the loss of this coolant could cause the turnings to heat and ignite. Although unlikely, this could result in the ignition and combustion of the original metal sample. Such a fire would not represent a major hazard to the operating area as it burns itself out.

A maximum of 1000 grams of 63% enriched uranium could be consumed in the fire. Based on experiments with massive pieces and turnings of plutonium metal, <sup>(5)</sup> the maximum fraction airborne in such a fire is much <1% or 10 grams in this case, this would be released to the exhaust system where it is conservatively assumed that there is no plateout or gravitational settling to reduce the airborne concentration. The exhaust air is passed through a HEPA filter bank with an efficiency of 99.95%. This reduces the airborne particulates by a factor of  $5 \times 10^{-4}$  prior to release to the atmosphere. Thus, the net release to the environment is <5 mg of uranium. The dose (50-year commitment) at the site boundary is  $\sim 1.6 \times 10^{-7}$  rem.

a. Uranium Fire

Uranium metal may be pyrophoric in certain forms and in an environmental release may result in a fire involving the combustion of fuel materials. Massive pieces of uranium metal do not generally burn at room temperature unless exposed to water some time prior to combustion. <sup>(6,7)</sup> Turnings can ignite during machining operations but no machining is performed directly on the fuel material during the fabrication of ATR and EBR-II elements. It is possible for powdered uranium metal to ignite at room temperature and when uranium-aluminide ( $UAl_x$ ) buttons are crushed into a powder during the fabrication of ATR fuel elements. Aluminum powder is also pyrophoric and experiments have shown that the addition of small amounts of aluminum can greatly increase the pyrophoricity of uranium. <sup>(8)</sup> While it is unlikely that dry  $UAl_x$  powder will ignite at room temperature, the friction during the crushing could cause ignition if this were performed in air.

The crushing and sieving process and all subsequent handling of the  $UAl_x$  powder are performed in a glovebox with an argon atmosphere except when it is removed in a sealed stainless steel container. The oxygen content of the cover gas is continuously monitored and an audible alarm is triggered when this exceeds a preset limit. The pressure in the glovebox is maintained slightly negative with respect to the room pressure to prevent out-leakage of radioactive material. This is controlled by pressure switches connected to solenoid valves in the exhaust system and argon inlet lines. An audible alarm is triggered when the gauge pressure falls outside of two preset limits. In the event of a small leak in the glovebox, argon would be fed into the box to maintain the oxygen at a

safe level. A buildup in the oxygen concentration would cause the oxygen alarm to sound and any powder being processed could be transferred to sealed stainless steel canisters where it would not present a fire hazard.

No powder is stored in the glovebox complex overnight and the presence of operating personnel during working hours allows safety measures to be taken to prevent serious consequences from a glovebox leak. The glovebox is constructed of steel with a thick sheet of Plexiglas bolted to the face and is firmly bolted to the floor. The Powder Room does not contain any large moving equipment which could accidentally generate projectiles with sufficient energy to penetrate the glovebox. Thus, a fire during the processing of the  $UAl_x$  powder would require a major accident, such as a severe earthquake, to serve as an initiating event by causing significant damage to the glovebox.

The most serious consequences from a damaged glovebox would follow while  $UAl_x$  buttons are being crushed to a powder or being processed through the sieves. These operations could result in small amounts of the powder being airborne. At high enough concentrations, the  $UAl_x$  powder can be explosive in air.\* If the ignition proceeds with an explosive reaction, this could generate a shock wave and disperse the process powder throughout the glovebox. The maximum pressure caused by the explosion is strongly dependent on the airborne concentration of the metal powder. Experimental data on the explosive behavior of uranium powder<sup>(9)</sup> indicate a rapid drop in the maximum pressure below  $0.2 \text{ g/cm}^3$ . The metal powder can not be maintained in such a high concentration unless vigorously agitated. There is no equipment used which could perform this function. In addition, the airborne powder would be confined to a relatively small volume in the glovebox and the breach of containment required to admit large quantities of air would be significant enough to disallow considering the glovebox as a closed system. Thus, the pressure wave caused by the explosion would be small and would be further decreased by the expansion within the glovebox and through the breach in containment. The glovebox exhaust feeds through a small line to the main exhaust duct. Any shock wave transmitted through this line would rapidly expand into the much larger exhaust duct and become subsonic.

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\* Uranium has a lower explosive limit (LEL) of  $0.06 \text{ g/cm}^3$ , aluminum has an LEL of  $0.04 \text{ g/cm}^3$  (Reference 10)

Thus, no shock would reach the main filter bank. The worst effects expected from the explosive wave would be to the glovebox prefilter and increased damage to the already damaged glovebox.

The effects to the environment from the ignition and subsequent burning of the uranium-aluminide powder inventory are dependent on several factors. These include:

- 1) The fraction of oxide which becomes airborne
- 2) The fraction of airborne particulates which settle due to gravitational effects
- 3) The fraction of airborne particulates which plate out on surfaces
- 4) The leak rate from the confines of the glovebox
- 5) Filtration efficiency prior to release to the atmosphere
- 6) The size distribution of the particulates released to the atmosphere.

There are two different aspects to be considered concerning the fraction of oxides which become airborne. While the environmental release is limited by the airborne fraction, gravitational settling is enhanced by larger airborne concentrations. The maximum amount of powder allowed in the glovebox is 14.5 kg of  $UAl_x$ , 10.4 kg of which is 93% enriched uranium. This would produce 19.6 kg of mixed  $UO_2$  and  $Al_2O_3$ . The glovebox has a volume of  $0.9 \text{ m}^3$  so that the concentration of the airborne particulates would be  $0.022 \text{ g/cm}^3$  if all material became airborne. The extremely large concentration together with the small glovebox volume<sup>(11)</sup> would cause the particulates to rapidly settle to the floor.

Release of the oxide particles from the Powder Room would be through the exhaust system. In addition to the exhaust in the glovebox, some of the particles would leak through the postulated breach in containment. However, this is small since air is being drawn in through this point. Also, the exhaust in the Powder Room is not as great as in the glovebox and particulates leaked into the room would settle rather than go through the exhaust. Therefore, this is neglected. The glovebox exhaust provides for 100 ft/min airflow if both 8-in diameter glovebox ports are open. This is equivalent to a volumetric flow rate of  $70 \text{ ft}^3/\text{min}$  and at this rate, it would take 26 sec for a complete exchange of air in the glovebox.

The particles settle at a much faster rate than they can be removed by the exhaust.\* Therefore, only a small fraction can be released to the exhaust system. To allow a conservative calculation of the release of this material it is assumed that 1% of the mass is transported to the exhaust filter bank. The filter has an efficiency of 99.95% which would reduce the concentration by a factor of  $5 \times 10^{-4}$ . Thus, the net release to the environment would be  $10.4 \text{ kg} \times 0.01 \times 5 \times 10^{-4} = 52 \text{ mg}$  of uranium.

The amount of concentration which can be inhaled without harmful effects is dependent on the particle size distribution. The available data on particle size distribution for the combustion of uranium is based on experiments using foils and massive pieces. This is not readily applicable for burning powders since oxide size distribution will depend on the size of the raw powder. There will also be agglomeration occurring in the glovebox prior to release. The large initial concentration would also enhance agglomeration so that even if the particles produced are small, they will rapidly generate much larger particles. However, since none of these effects can be readily evaluated, it will be conservatively assumed that all of the particles released are small enough to be inhaled. The dose (50-year dose commitment) at the site boundary is equal to  $1.7 \times 10^{-7}$  rem.

b. Major Explosion

Gases and liquids which produce vapors that can be explosive when mixed with air are not handled in significant quantities in the fuel fabrication area or anywhere else in the building. The only material which is potentially explosive is the finely divided uranium-aluminide powder. Since an explosion would represent an extreme case of the ignition of the  $\text{UAl}_x$  powder, the effects are included in the discussion in the preceding section of this report.

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\* An attempt at calculating the fraction released using the HAA-3B computer code failed because of the large concentration. The settling rate exceeded the capacity of the computer code.

c. Nuclear Safety

The fuel fabrication utilizes batch mode processing which allows close control on the amount of fuel handled at each station. The work station limits are conservatively established by assuming the fuel is fully reflected and, in most cases, fully moderated in a spherical geometry. The double contingency rule is then applied so that no one event, such as double batching, can result in a critical configuration. The design of the facility excludes water flooding at all work stations except for a required rinse of the ATR fuel elements. In this case, the rack for loading fuel plates into a tank of water is designed so that the maximum number of plates allowed is <45% of critical. The maximum number of plates in the cleaning room is also limited such that they cannot be made critical even if all plates are loaded into the tank. Thus, a criticality must be considered extremely unlikely.

A review of the actual operation indicates that most of the process is inherently safe since the quantity of material handled is far below the conservative quantities established as the work station limit. The closest approach to conditions in which a criticality could be postulated is the crushing/sieving area for the ATR elements. In this work station, a maximum of 14.5 kg of  $UAl_x$  powder containing 9.7 kg  $U^{235}$  is allowed. However, the addition of aluminum to form the  $UAl_x$  alloy reduces the uranium density to less than one-third of that for pure metal. Aluminum itself is basically neutral, being neither a neutron moderator nor absorber. While 9.7 kg of  $U^{235}$  could be made critical in 6.6 liters of water,<sup>(12)</sup> assuming the solution is configured in a fully reflected sphere, an additional liter would be required due to displacement by the lower density material. This would result in a more dilute mixture and since  $UAl_x$  is not soluble in water and has a greater density than water, it would settle to the bottom. Water is also specifically excluded from the glovebox, with the nearest waterline being the fire sprinkler system in the ceiling. The glovebox is hermetically sealed so that filling it with water would require an accident causing an opening in the glovebox while simultaneously breaking the waterline to pour water into the opening.

Other accidents involving errors in the handling of fuel materials were also considered. These include substituting 93% enriched ATR fuel raw stock for 67%

enriched EBR-II fuel raw stock and using too much uranium and too little aluminum while making the  $UAl_x$  alloy. The use of the higher enrichment for the EBR-II fabrication would not by itself result in a potential situation for a criticality accident but would reduce the safety margins at each stage of the processing. The use of too much uranium in the  $UAl_x$  alloys would result in increased reactivity for the fuel plates. The cleaning room allows a maximum of 40 plates and, based on the most reactive type plate, these could have a multiplication factor of 0.98 when immersed in water. An increase in the  $U^{235}$  loading could make this greater than 1.0. A criticality might result if all 40 plates were then accidentally immersed in the cleaning bath. If enough  $U^{235}$  is added to each element, then less than 40 might be sufficient to form a critical array. However, the loading rack is limited to 12 plates and a small increase in the uranium loading will not make these critical. Even if a criticality did occur, it would involve a uranium metal and water assembly which is selflimiting. For the purpose of assessing the environmental effects of a criticality, it will be postulated that such an event occurred and resulted in a total of  $10^{18}$  fissions.

As a result of this event, there will be doses accumulated from the neutron and prompt gamma burst, the gamma dose exposure from the decay of the fission products, and the inhalation doses. These dose data, at the nearest AI facility, the nearest site boundary, and the nearest residence, are presented in Table B-XIV-1 for the event occurring either in the ventilated area of Building 001 or the shop area.

d. Earthquake

The Headquarters facility at AI is located in the region of the San Andreas fault. An earthquake with a Richter magnitude of 7.3 has a probability of occurring within approximately 25 to 50 year intervals along this fault. The buildings at the facility are constructed to withstand such an earthquake without suffering major damage. Storage racks, work benches, and gloveboxes in the fabrication facility are firmly bolted to the poured concrete floor; this protects them from being upset and spilling their contents onto the floor during a major earthquake.

The fuel fabrication facility is located in an enclosed area within the manufacturing building. The only direct communication with the outside environment,

TABLE B-XIV-1  
RADIATION DOSES FROM ASSUMED 30 Mw-sec  
CRITICALITY ACCIDENT

Neutron and Prompt Gamma Dose (rem)			
Affected Facility	Nearest AI Facility	Nearest Site Boundary	Nearest Residence
Bldg 001 (ventilated area)	12	6.0	1.5
Bldg 001 (shop area)	30	3.0	1.2
NMDF	12	0.09	<0.01

Radiation Dose (Gamma) From Decay of Fission Products Retained in Building (rem)			
Affected Facility	Nearest AI Facility*	Nearest Site Boundary†	Nearest Residence†
Bldg 001 (ventilated area)	0.3	1.2	0.3
Bldg 001 (shop area)	1.2	0.8	0.25
NMDF	0.3	0.014	<10 <sup>-3</sup>

Additional Radiation Doses From Assumed 30 Mw-sec Criticality Accident (rem)				
Affected Facility (origin)	Nearest Site Boundary		Nearest Residence	
	Cloud Gamma	Fallout*	Cloud Gamma	Fallout*
Bldg 001 (ventilated area)	6.0	4.0	4.0	3.0
Bldg 001 (shop area)	4.0	4.0	2.5	3.0
NMDF	0.1	0.2	0.03	0.05
AIHL	0.1	0.2	0.02	0.025

\* lifetime dose

Inhalation Fission Product Doses* From Assumed 30 Mw-sec Criticality Accident (rem)								
Affected Facility (origin)	Site Boundary †				Nearest Residence †			
	GI Tract (rem)	Thyroid (rem)	Lung (rem)	Bone (rem)	GI Tract (rem)	Thyroid (rem)	Lung (rem)	Bone (rem)
Bldg 001 (ventilated area)	6.0	3.0	2.0	1.0	4.0	2.5	1.5	0.8
Bldg 001 (shop area)	7.0	5.0	2.0	1.0	5.0	3.0	1.5	0.7
NMDF	0.5	0.3	0.1	0.09	0.10	0.09	0.03	0.02
AIHL	0.2	0.1	0.06	0.04	0.06	0.06	0.02	0.01

\* Assumed release: 100% Xe, Kr; 25% I, Br; ≤1% of other fission products.

† lifetime doses

AI-76-21

B-XIV-12

in the event of a breach in containment, is at the SNM vault. The wall is reinforced block construction and major damage from an earthquake is unlikely. The working areas would not vent to the atmosphere but into the much larger manufacturing area. The fuels handled are primarily in massive form, with some metal powders, and are stored in stainless steel containers. Therefore, it is not expected that an earthquake would directly cause any significant release of fuel material to the environment.

An earthquake, however, could provide the initiating event for an unlikely sequence of events resulting in some other type of accident. This is illustrated in the previous sections on fire and criticality where the accidents require situations which are impossible during normal operations. It is remotely possible that these situations could occur following a major earthquake. Therefore, the environmental effects of an earthquake would be limited by these accidents.

#### C. OPERATIONS AT NDFL

##### 1. Building 055

##### a. Nuclear Safety

The fabrication of the mixed carbide fuels uses batch processing. Only a limited amount of fuel is permitted outside of the storage vault for processing and this material goes through the complete manufacturing cycle before another batch can be released. Work station limits are conservatively established to insure against the possibility of a criticality. Records are maintained at each work station to provide a strict accounting of all fuel materials handled. Transfer of all material requires the prior approval of an MBA custodian to assure that the work station limits are not exceeded. The custodian must also assure that all of the records are properly maintained and current.

##### b. Fire Protection Systems

An automatic wet pipe sprinkler system is provided in all areas of the building except in the glove box room and the vault. (Alternate fire suppression methods are used in these rooms.) The exhaust ducts and each room except the administration area and the change rooms are protected by one or more PYR-A-Larm smoke detectors. Each glovebox, the transfer tunnels, the vault, and the radioactive exhaust equipment area contain one or more heat actuated devices (HAD).

A manual fire alarm system is also provided with fire alarm boxes located throughout the facility. An alarm signal from any of these devices is transmitted simultaneously to the Facility Annunciator Panels in the glovebox room and the building lobby, sounding an evacuating horn, and to the Protective Services Control Center (PSCC). Additionally, the HAD's actuate an amber warning light on the particular glovebox that activated the alarm.

Portable fire extinguishers are located throughout the facility. These include dry chemical, CO<sub>2</sub>, water pump, and bayonet nozzle extinguishers for use through gloves.

A high-pressure fire hydrant is located in the parking lot about 150 ft NW of the building and two fire hose connections are on the exterior walls of the facility next to the east and west emergency exits.

Most of the gloveboxes are normally filled with high-purity argon which effectively prevents and/or extinguishes all classes of fires. The vault and all gloveboxes except Numbers 1 and 1A can be flooded with argon through external manual valves.

All fire prevention, detection, and suppression equipment is inspected and, where possible, given an operational test at regularly prescribed intervals. A computerized reminder and followup system, the Calibration Recall and Inventory System (CRIS) is used to assure that these inspections are performed at the appropriate times.

The storage vault also contains heat actuated detectors. In the event of a fire in the vault, the air supply would be cut off and an argon purge activated. This would limit the extent of the fire. The construction of the vault precludes spreading of the fire outside of the vault.

c. Flammable Materials at the Facility

Fuel for the diesel engine in Room 132 is stored in an underground tank and an aboveground 50-gal tank, both exterior to the building. Flammable liquids, including benzine, methanol, and vacuum pump oils, are stored in a metal cabinet outside the west wall of the building. The materials are moved, as needed, through the administration area, change rooms, and service laboratory area to either the chemistry laboratory or the glovebox room. Storage in these areas

are limited to a maximum quantity of 5 gal. The specific quantity of flammable liquid required for a particular task such as methanol binder solvent for the fuel powder, or for the ultrasonic cleaner in the glovebox is transferred into the box only as needed. The maximum quantity of combustibles in each box is rigidly restricted. This will be based on a maximum heat of combustion of the box contents.

The gloveboxes contain rigidly controlled quantities of fissionable materials and graphite, necessary processing equipment, limited quantities of plastic bagging material, a neoprene rubber glove or plastic bag at each glove port and a plastic bag over the bag-in ports. The vacuum pumps contain pump oil that is flammable.

Waste material from the gloveboxes is bagged out and transferred to the rear airlock (Room 130) and stored in sealed 55-gal drums. Room 130 is protected by the building wet pipe sprinkler system and a PYR-A-Larm smoke detector.

The 55-gal drums are transferred for storage to a special section of the Santa Susana Nuclear Materials Vault (Building 064).

Furnishings in the administration area are typical wooden chairs, tables and desks, metal bookcases, file cabinets and storage cabinets and miscellaneous cardboard storage boxes. The service laboratory area is furnished with laboratory benches — mostly wooden topped, metal storage cabinets, miscellaneous laboratory equipment, and general supplies — mostly paper-stored in cardboard cartons. The change rooms contain a rest room with ceramic and metal fixtures. They also contain cloth lab coats and cloth shoe covers, several wooden shoe storage racks, metal cabinets for storing lab coats and shoe covers, metal lockers for personal clothing and for general supplies, and cardboard and metal waste containers for used shoe covers and paper. A radiation monitor is also present. The facility equipment rooms generally contain specific support equipment but also contain a small quantity of ordinary combustibles.

#### d. Small Environmental Release

Routine chemical and metallurgical analyses are performed on small samples of the finished fuel materials. The preparation of metallographic samples requires the use of flammable liquids, such as methyl alcohol and lapping oil,

as well as epoxy for setting the samples. These gloveboxes also contain electric motors which could serve as a source of ignition. Under normal circumstances, the atmosphere in the glovebox is inert, and combustion cannot be supported. A failure in one of the gloves would allow air to enter the glovebox. Ignition of the flammable liquids could be caused by a spark from the motor. This would damage some of the other gloves in the box to allow a sufficient air supply to support a fire.

The nuclear material in the glovebox is in the form of high density sintered pellets of mixed carbides which are being potted for metallurgic analysis. The fire analysis in this section assumes total loading of 46 gm Pu plus 189 gm  $U^{235}$  for the (U, 20 wt % Pu) C fuel.

The mixed carbides are combustible and a fire in the solvents could cause ignition of the pellets. Studies indicate that the behavior of the burning of sintered powder is about the same as for metals.<sup>(13)</sup> For the purpose of this analysis, it will be assumed that all of the fuel is consumed and that 1% is released into the ventilation system. Although there is a HEPA filter in the glovebox, it is further assumed that this is destroyed by the fire. The final HEPA filter bank, prior to release through the stack, is remote from the glovebox and would not be damaged by the fire. This filter bank is rated 99.95% efficient for  $0.8/\mu\text{m}$  diameter particles, reducing the release by a factor of  $5 \times 10^{-4}$ . Thus the net release from the fire would be 0.24 mg Pu and 0.94 mg  $U^{235}$ , which would be in the form of oxides. Such a release would result in a total dose of  $\sim 0.1$  mrem at the site boundary.

e. Major Fire in the Glovebox Area

A major fire originating outside the building (a brush fire) or occurring outside the Glovebox Laboratory will not result in the release of significant quantities of fuel material due to the fire resistant structure and small quantity of combustibles present in any one area. If a fire were to start in any room, the likelihood of its spreading to any adjacent room is very small because the walls are of noncombustible, heat resistant materials. The major route for spreading of a fire is the floor tiles but these do not readily burn. A fire in the vault would be easily contained by the vault itself, and is easily isolated by the slide valve on the radioactive exhaust and extinguished by flooding the vault with argon.

Thus, material may be released only by a fire occurring in the Glovebox Laboratory and more specifically in one of the gloveboxes.

The milling and agglomeration of the carbide is performed in an inert atmosphere glovebox containing Carbowax 600 and methanol. Both of these are flammable and can be ignited by electrical or mechanical sparks from the equipment in the box. In addition, the carbide fuel is in the form of a finely divided powder which would readily burn in the presence of oxygen and a flame from the burning liquids.

An argon atmosphere is maintained in the glovebox to protect against the occurrence of a fire. The glovebox is also equipped with a heat actuated device which would simultaneously trigger an audible alarm and light up an indicator on the control panel in the event of a fire. These would allow taking proper measures for extinguishing a fire.

To postulate a fire in the glovebox, it is assumed that air enters the glovebox, possibly through a breached gloveport, and that the alarm system fails to function. The flammable liquids in the box are assumed to ignite and the fire rapidly spreads to the carbide powder. While the carbide powder is pyrophoric, it is not as reactive as metal powder. Experiments on the oxidation of UC indicate that both the rate of reaction and the activation energy is less than that for pure metal by almost an order of magnitude. (14)

Data on the release fraction from the burning of carbide fuels are not available. However, when it burns it does not give off much smoke. Carbon dioxide and carbon monoxide are formed by the oxidation of the free carbon and released as gases. In order to assess the environmental effects of a fire, it is assumed that the HEPA filter in the glovebox is destroyed and that there is no plateout or settling in the ductwork, prior to release to the final filter bank. The final filter bank is rated 99.95% efficient for 0.8  $\mu$ m diameter particles, reducing the net release by a factor of  $5 \times 10^{-4}$ .

The fire analysis in this section assumes that the mass of carbides processed in the glovebox is about 2000 gm, containing 1100 gm  $U^{235}$ ; 430 gm  $U^{238}$ ; and 380 gm Pu. The net release from a fire, with 10% airborne and filtration efficiency of 99.95% is: 55 mgm  $U^{235}$ ; 22 mgm  $U^{238}$ ; and 19 mgm Pu. It is conservatively assumed that all particulates are small enough to be inhaled into the

lung alveolar tissue. The total lung dose at the site boundary is  $2.1 \times 10^{-5}$  mrem ( $U^{235}$ ),  $1.1 \times 10^{-5}$  mrem ( $U^{238}$ ),  $7.4 \times 10^{-1}$  mrem ( $Pu^{239}$ ) or a total of  $\sim 0.74$  mrem.

f. Nuclear Safety

Relatively small amounts of fissile materials are handled at one time during the fabrication of mixed carbide fuel elements. These materials are handled in gloveboxes where water is available only in limited quantities as required. All criticality control limits are conservatively established to assure against a criticality accident. This includes the application of the double contingency rule, requiring at least two unlikely events to occur before a criticality accident is possible. In general, the rules are applied with sufficient conservatism that a more rigorous analysis would show that even if two unlikely events occurred, criticality would still not be possible. Additional safety margin is often provided by use of work station limits set below.

All containers in the gloveboxes are limited in capacity such that even if filled with water, the volume is not sufficient for a criticality. Fuel materials in massive form would remain settled on the floor of the glovebox in the event of flooding so that they could not approach a critical configuration. Powders handled during the process are oxides and carbides. The oxides are not soluble in water and would settle to the floor during any inadvertent admission of water into the box. The carbides react violently with water,<sup>(15)</sup> especially in powder form producing oxides and generating gases. The resultant oxides would precipitate out of the water while the gas bubbles generate voids, reducing the water's moderating effect. The minimum volume of water required for criticality is 7 liters and the resulting solution contains only about 2%, by volume, of fuel. This represents a very dilute mixture for a material which is not soluble in water.

The only source of water capable of supplying sufficient moderation to instigate a critical accident is the overhead pipe for the sprinkler system. Filling a glovebox with water would require a large breach near the top of the glovebox while simultaneously rupturing the water line such that the water pours into the glovebox. Such a situation could only occur as the result of a major event such as a major earthquake. For the purpose of analysis, it is assumed that

such an unlikely accident does occur. The criticality would be self limiting and it is assumed that the energy release is 30 Mw-sec.

As a result of this event, there would be doses accumulated from the neutron and gamma burst, the gamma dose exposure from the decay of the fission products, and the inhalation doses. These dose data at the nearest AI facility, the site boundary, and at the nearest residence are presented in Table B-XIV-1.

g. Major Explosions

Building 055 is equipped with a natural gas supply. The gas is used primarily for heating water and a small amount for supplying analytical laboratory equipment such as Bunsen burners. A leak occurring in the laboratory gas supply line, which is routed through the glovebox room, could be undetected and allow gas to accumulate. Since the room undergoes approximately 10 air changes per hour, and since the supply air registers are located within 6 ft of the ceiling, gas concentration buildup will be minimized by the ventilation system. A complete rupture of the 1-in. gas line in the glovebox room, operating at 8 in. H<sub>2</sub>O pressure, would release  $\sim 750 \text{ ft}^3/\text{hr}$  of natural gas into the room. Natural gas has a lower explosive limit of 3.8 to 6.5% in air. The glovebox room volume is  $\sim 87,000 \text{ ft}^3$  and is ventilated at the rate of  $1.1 \times 10^6 \text{ ft}^3/\text{hr}$ . Under these conditions of ventilation, even an undetected leak, present for an extended period of time, could not fill the room with natural gas homogeneous mixture with a concentration equivalent to the lower explosive limit. Although higher concentrations would be present at the immediate vicinity of the leak, if ignition did occur, the result would be an open flame which would actuate the heat detectors, thereby providing an alarm.

The building is constructed of steel and reinforced concrete. The gloveboxes, where the fuel is handled, are constructed of steel with Plexiglas on each of two faces. If a natural gas explosion did incur heavy damage to the gloveboxes, fuel material release into the room would be controlled by the glovebox low and high volume purge systems. The HEPA filtration system, located in a separate area of the facility, would not be affected by the explosion and would contain any airborne particulates generated.

The only possibility of releasing fuel material to the environment is if an explosion occurred during the handling of powder materials. This event is not credible since operating personnel would detect the leaking gas before significant buildup occurred. In addition, the room exhaust would be continuously removing the gas. However, it is assumed that an explosion occurs and that there is major damage to a glovebox containing powder. The powder may become dispersed throughout the room; most of it will settle on equipment in the room, causing widespread contamination within the affected laboratory area. Since the building remains intact, the only means of release to the atmosphere is through the facility HEPA filtration system. The large diameter particles will settle out rather than remain airborne leaving only a small fraction to enter the exhaust duct. For the purpose of evaluating an explosion accident, it is assumed that 1% of the powder enters the exhaust air system and is transported to the HEPA filtration system. This system provides a further reduction in the magnitude of the release by a factor of  $5 \times 10^{-4}$ . The net release from such an accident, based on the typical maximum amount of fuel material handled, would be: 11 mg  $U^{235}$ ; 4.3 mg  $U^{238}$ ; and 3.8 mg  $Pu^{239}$ . The total dose at the closest site boundary ( $\sim 1,250$  ft) and assuming constant wind in this direction and a  $X/Q$  of  $3.0 \times 10^{-3} \text{ sec/m}^3$  is  $\sim 47$  mrem (lungs), of which  $\sim 96\%$  results from the  $Pu^{239}$  component.

#### h. Major Earthquake

The most commonly acknowledged active fault in the Southern California area that could lead to significant earthquakes at the site is the San Andreas fault which passes within 34 miles of the Santa Susana site. Estimates have been made of the potential magnitude of the earthquakes that may occur along this fault and it has been estimated that an earthquake with a Richter magnitude of 7.3 has a probability of occurring every 25 to 50 years along the San Andreas fault. Should such a magnitude earthquake occur at closest proximity to the site, empirical formulas can be used to estimate the site motion at Santa Susana. An estimate based on the Schnabel-Seed<sup>(16)</sup> formulation results in a prediction that the 7.3 magnitude earthquake along the San Andreas fault would produce maximum ground accelerations of 0.16 g at the Santa Susana site. Therefore, for purposes

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\* 0-8m value<sup>(13)</sup>  
1.2

of this evaluation of the seismic capability of Building 055, it has been assumed that the Operating Basis Earthquake would be one of Richter magnitude 7.3 on the San Andreas fault, resulting in maximum site ground acceleration on the order of 0.16 g.

The building itself is constructed to the Uniform Building Code. This utilizes a more simplified analysis to determine the maximum ground acceleration so that structures built to this code must be capable of withstanding an acceleration of 0.28 g. Building the facility to these requirements adds a considerable safety factor over expected accelerations.

Fuel fabrication is performed in the Glovebox Laboratory which is an enclosed area in the center of the building. Even if an earthquake of sufficient magnitude occurred to breach the primary containment, this would not provide a direct path for the out-leakage of nuclear material. Airborne material generated as a result of a major earthquake would have to leak out of the glovebox area before it could be released to the atmosphere. Due to the large volume of the Glovebox Lab and the surrounding areas, and also because of the high density materials used, only a small fraction of airborne powder would be released through a breach in the building containment.

A one-half ton crane is used in the Glovebox Laboratory for moving heavy equipment. The ground motion during an earthquake could cause this to roll across the floor causing significant damage to the gloveboxes. For the purpose of analysis, it will be assumed that this occurs during the handling of carbide powder and that the impact of the crane causes the entire inventory to become airborne. It will further be assumed that the earthquake does cause a breach in the outer wall. The pressure in the building is maintained negative which would establish air flow patterns in toward the Glovebox Laboratory. However, it will be postulated that 1% of the airborne powder eventually leaks through containment and into the atmosphere. The 24-hr doses and 1-yr population doses for the ground level releases are listed in Table B-XIV-1.

## 2. Atomics International Hot Laboratory (AIHL)

### a. Process Summary

The AI Hot Laboratory is used for those operations under the broad license where unencapsulated fuel or fissile materials are handled or processed.

Representative of such operation is the current work being performed on the decladding of SRE-Core II fuel elements. Consideration of such accidents that might occur as a result of this operation would umbrella or be typical of those accidents that could be considered for those activities undertaken at the AIHL under the broad license. A storage can containing a fuel element is received from storage and transferred into the AIHL complex. The fuel element is disassembled and loaded into a washing tank. Residual sodium on the surface of the elements is removed by reacting it in a solution of Dowanol. The wire wrap is then removed from each element, the fuel rods cut, and the individual fuel slugs unloaded into a breadpan containing Dowanol. Residual NaK from within the fuel rod and on the fuel slugs is removed by the Dowanol. Cleaned fuel slugs from two fuel elements are loaded into aluminum shipping canisters which are then seal welded. These are stored at the Radioactive Materials Disposal Facility (RMDF) until ready for shipment to Savannah River.

b. Nuclear Safety

The fuels being handled in the hot cells are low enrichment or concentration uranium requiring some form of moderating material before criticality is possible. Small amounts of Dowanol and alcohol are used for cleaning the fuel elements but these are insufficient for a critical system. The hot cells do not provide the means for adding these materials in large quantities. Generally, they are added a gallon at a time, as needed. Water is excluded from the fuel areas with the nearest water supply being an overhead line outside the 42-in. thick reinforced concrete wall. Containers in the cell are limited in volume and cannot contain sufficient fuel and moderator needed for criticality. The fuel is in massive form and would require some means of support in order to achieve a critical configuration. The only such means available are the storage racks which are designed to be <45% of critical under conditions of full moderation and reflection. The fuel slugs which are removed from the fuel elements are also in massive form and would remain settled on the floor of the cell even in the presence of water. Thus, they could not be configured in a critical geometry. The minimum diameter of a critical cylinder under conditions of full moderation and reflection is 10.7 in. To achieve criticality would require a depth of at least 1 ft. The work is handled on a platform which is 3 ft above the actual floor of the cell so that the cell would have to be flooded to a depth of 4 ft. About 6,000 gal

of water would therefore be required in Cell 3 where the fuel is removed from the cladding. Since the nearest water line is separated by 42 in. of reinforced concrete, this is not considered possible.

c. Fire Protection

The hot cells and decontamination rooms are monitored by heat actuated devices (HADs). These provide both an audible alarm and a visual indicator on the control panel. A nitrogen purge system would be activated in the event of a fire, flooding the area with nitrogen to reduce the oxygen available for combustion. Hot cells where sodium and NaK are handled are normally filled with nitrogen to prevent fires from starting.

The cells are constructed of 42-in. thick concrete which would prevent the spread of fire. Thus the only potential for the release of nuclear materials would occur in the event of a fire within the cell.

d. Major Fire

A fire at the AIHL involving the release of radioactive contaminants would have to occur within one of the hot cells. The fuel elements containing NaK are cleaned in Dowanol and, because of the fire hazards present with the mixing of these liquids, the work is performed in a nitrogen atmosphere. In order for a fire to occur, it is necessary to admit air into the cell. This would require the simultaneous occurrence of a leak into the cell together with a failure in the nitrogen purge system. Due to the construction of the cell, a major leak is not very credible. The most likely place for a leak would be in the seal where the master slave manipulator penetrates the concrete wall. If such a leak did occur, it would generally be small but for the purpose of this analysis, it is assumed to be large enough to admit sufficient quantities of air. It is also assumed that the nitrogen purge system fails.

Since the fuel handled has been removed from a reactor, there are fission product gases entrained in the metal lattice. Since these cannot be trapped by the radioactive exhaust filter, they represent the most significant potential for release to the environment. The short half-life gases, such as xenon and iodine, have decayed and are no longer present. The problem comes from Kr<sup>85</sup> which has a 10.76-yr half-life. The average activity in one fuel element is 52 Ci of Kr<sup>85</sup>. It is assumed for this analysis that the entire inventory is released

instantaneously to the environment. The radiation dose at the site boundary for this release is calculated to be 0.7 mrad beta (skin dose) and  $6.5 \times 10^{-3}$  mrem whole body gamma radiation dose.

e. Major Explosion

Alcohol is used as a cleaning agent in the hot cells and its vapors can be explosive in air. However, due to the small amounts of alcohol used and the construction of hot cells, an explosion caused by the ignition of the vapors would not result in any real damage to the cell. The effects on the release of radioactive contaminants would be no worse than a fire considered in the previous section.

## XV. IDENTIFICATION OF POSSIBLE OFF-SITE ACCIDENTS

The only accidents considered credible are those that may occur during transportation. Off-site movements of special nuclear materials consisting primarily of finished fuel assemblies and intrasite shipments of those materials between AI Headquarters and the NDFL are made subject to the stringent regulations and requirements of the Nuclear Regulatory Commission and the Department of Transportation. These regulations require that the shipping packages must be designed to withstand certain specified normal conditions of transport and hypothetical accident conditions without loss of contents, significant loss of shielding, and (in the case of fissile materials) without criticality. The accident-damage test series which the shipping container must withstand without loss of contents or criticality is as follows:

- 1) A 30-ft drop onto an essentially unyielding surface in the most damaging orientation, followed by
- 2) A puncture test consisting of a drop from a height of 40 in. onto 6-in. diameter steel rod, striking the container in its most vulnerable spot, followed by
- 3) A 1/2-hr fire test at 1475° F, followed by
- 4) Submersion in water to a depth of at least 3 ft for at least 8 hr (for fissile material only).

While the accident damage test conditions cannot exactly simulate all of the possible conditions which might occur during a transportation accident, they are designed to provide a high degree of assurance that the packaging will withstand the effects of collision, fire, and submersion without leakage of the contents.

A recent study by the AEC\* discusses the probabilities of truck accidents for varying degrees of severity, ranging from minor to extreme. These probabilities range from  $1.3 \times 10^{-6}$  per vehicle mile for minor accidents involving no releases, to  $2 \times 10^{-14}$  per vehicle mile for extreme accidents.

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\*"Environmental Survey of Transportation of Radioactive Materials to and from Nuclear Power Plants," prepared by the Directorate of Regulatory Standards, USAEC, Wash-1238, December 1972

During 1975, AI received 16 separate shipments from several sources for a total of 24,300 vehicle miles of transport. The occurrence probabilities would then be  $3.2 \times 10^{-2}$  per year for minor accidents and  $5 \times 10^{-10}$  per year for extreme accidents. During 1975 AI made 22 separate shipments for a total of 26,000 vehicle miles of transport. The occurrence probabilities are  $3.4 \times 10^{-2}$  per year for minor accidents and  $5.2 \times 10^{-10}$  per year for extreme accidents. Combining probabilities for all shipments gives  $6.6 \times 10^{-2}$  per year for minor accidents and  $1 \times 10^{-9}$  for extreme accidents.

Based on regulatory standards and requirements for package design and quality assurance and the results of tests and past experience, these packages are designed to withstand all but the very severe, highly unlikely accidents. The probability of a package being breached is so low that a detailed evaluation was not considered necessary. In addition, the consequences associated with a release of any SNM are insignificant and occurrence is extremely improbable; therefore, the risk of impact to the environment is very minor.

## XVI. EMERGENCY PROCEDURES

The emergency plans at AI consist of a "Master Emergency Plan" which has been prepared for the use of the service functions that are responsible for reacting to an emergency that might affect the entire organization or any segment of it. This plan includes those division policies and organizational charts that would be needed and specific instructions to Industrial Security; Protective Services; Medical; Public Relations; Health, Safety, and Radiation Services; and Facilities and Industrial Engineering for a broad spectrum of possible emergencies. This plan is included as Appendix A-1.

In addition to the "Master Emergency Plan," emergency plans for the facilities involved with SNM licensed activities are currently being updated. The format for such plans is included in Appendix A-2. An example of such a plan for the Fuel Fabrication Area of Building 001 prepared to this format is included as Appendix A-3.

## **XVII. PUBLIC RELATIONS**

Material in this category has not been requested. AI has enjoyed a history of satisfactory community relations and an acceptance of those operations which are to be continued under the requested SNM license renewal.

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B-XVII-1

### **XVIII. DESCRIPTION OF WASTE RETENTION PONDS, TANKS, AND BURIAL SITES**

At the AI/Headquarters facility, radioactivity bearing liquid wastes are generated only as a result of production of enriched uranium fuel elements in Building 001. The primary source is floor scrub water and, to a small extent, sinks located in the controlled area for handwashing. No water is used in conjunction with production of any unencapsulated fuel material. Liquid wastes are temporarily retained in 1500-gal steel tanks pending recirculation for sampling, radioactivity analysis, and release to the city sewage system. Two tanks receive liquid effluent from the fuel production area. They are located in a concrete vault to provide secondary containment in the event of a tank failure.

At the NDFL, the surface discharge of wastewater, containing unnatural radioactive or nonradioactive constituents is not done. Only one retention pond receives influent from NDFL facilities and is located on Rocketdyne Division SSFL property. The retention pond lies at the head of Bell Canyon through which runs a natural drainage pathway leading into the Los Angeles River at its terminus. The pond was formed by damming a natural canyon with earthfill reinforced with concrete surfacing. The bed of the retention pond remains in its natural state. The influent entering the pond includes sewage treatment plant effluent, surface runoff water from industrial sources such as condensates from air conditioning equipment, etc., and rainfall. Average annual rainfall is about 16 in., with 70% of that total occurring from December through March.

The geological and hydrological conditions of the Santa Susana site are fully described in Sections A-IV & A-V of this report. In general, the hydrologic characteristics of the groundwater system at the site are determined by Chico formation sandstone which is generally coarse to lightly-pebbly in texture with some inclusion of fine sandstone and shale. The sandstone and shale are tightly cemented and the formation is several thousand feet thick. The Burro Flat area of the NDFL is composed of alluvial deposits of recent geological origin varying from 10 to 30 ft thick. The total porosity of the Chico sandstone is probably less than 1%. Test and production wells previously in operation on-site were pumping

from depths ranging from 370 to 650 ft below the ground surface. Replenishment of the aquifers from percolation into the subsurface rock structure by rainwater or impounded surface water is insignificant due to the general impermeability of the underlying sandstone formation and the absence of large area retention ponds.

## XIX. DESCRIPTION OF ON-SITE SEWAGE TREATMENT FACILITIES

### A. HEADQUARTERS FACILITIES

The Headquarters facilities are located in a metropolitan area and are connected directly to the Los Angeles Bureau of Sanitation sewer system.

All sanitary waste and laboratory wastes are routed directly to this system. Laboratory wastes are collected in 454-gallon increments, automatically proportionally sampled, and discharged to the sanitary sewer system. These samples are analyzed for radioactivity.

A quarterly report indicating volumes discharged and analyses of the effluent is submitted to the Bureau of Sanitation in compliance with Rules and Regulations governing disposals through the sanitary sewers of the City of Los Angeles, Section 64.30(d) of the Los Angeles Municipal Code.

### B. SANTA SUSANA FIELD LABORATORIES

The Santa Susana Field Laboratories are located in an unsewered area of Ventura County and therefore are provided with separate sanitary sewage systems. A sewage treatment facility services Atomics International and a small component test facility located in the Rocketdyne area. This sewage treatment plant is located south of 20th Street and "G" Street. Manufactured by the Chicago Pump Company, it is a package-type aeration plant with sewage purification accomplished through the use of the aerobic digestive process.

The entire facility is surrounded by natural vegetation, trees and rocks. There is no noticeable odor associated with the facility. A photo of the facility is shown in Figure B-XIX-1.

The facility is designed for a personnel capacity of approximately 885 and can readily be expanded if necessary. After 15 years of continuous use, some deterioration has been observed and a planned rehabilitation project is currently underway including the installation of an additional aeration tank.

Existing sewer lines are underground gravity-flow vitrified clay pipe with sufficient capacity to meet present requirements with margin for future development. The influent is received from the various buildings and processed through

AI-76-21  
B-XIX-2

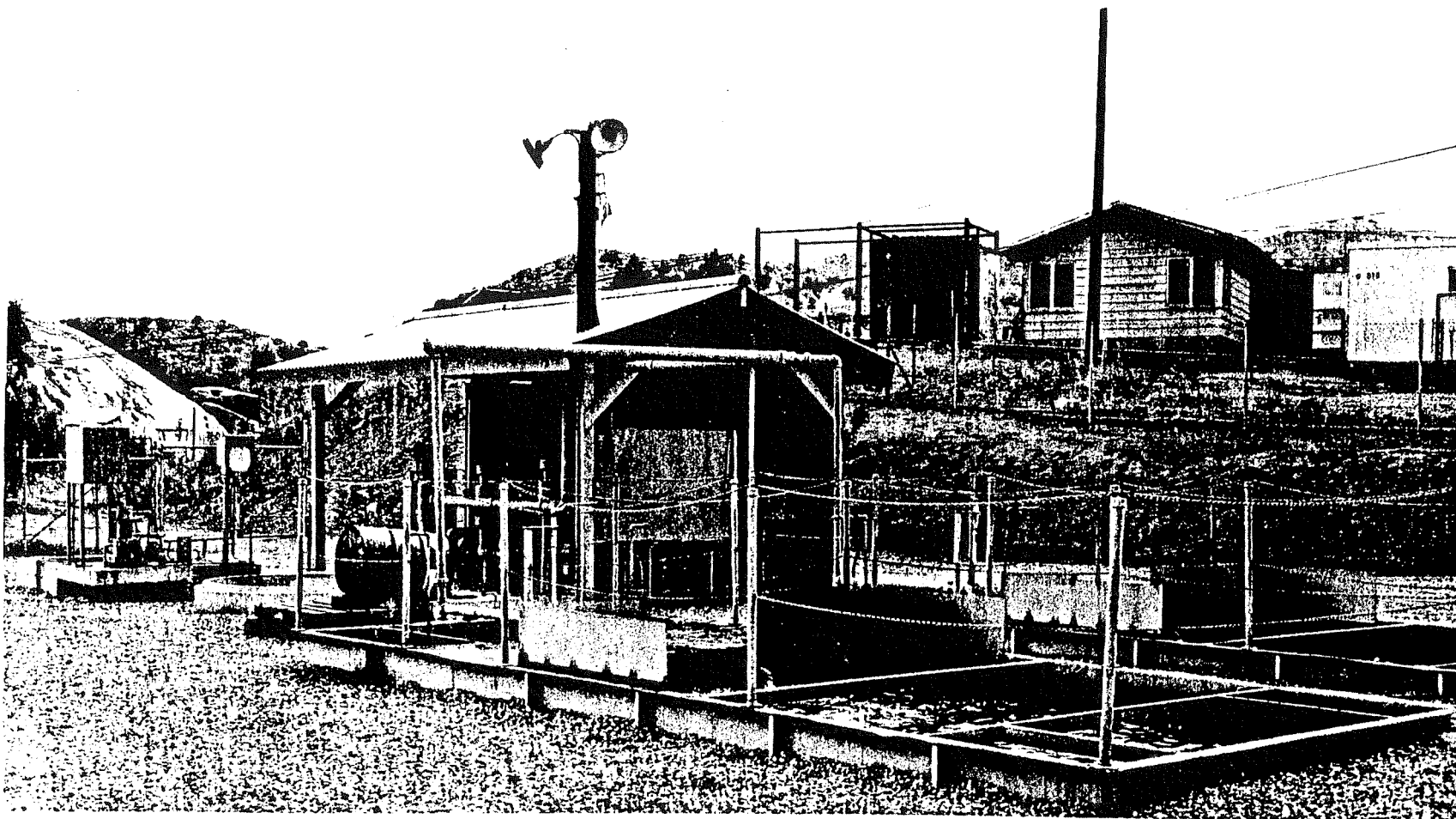


Figure B-XIX-1. Sanitary Sewage System — NDFL

00-103231

the aerobic digestive process and aeration facility. The effluent is chlorinated to 2 ppm residual chlorine as it is discharged. Annual average discharge in 1974 and 1975 was six million gallons. The discharge effluent is continuously monitored for residual chlorine and radioactivity.

The discharge effluent flows from the sewage treatment facility approximately a quarter mile to one of the Rockwell International's Rocketdyne Division retention ponds in which a high degree of dilution from cooling water from various projects (such as rocket engine flame deflectors) takes place. Water flows from this pond to a large retention pond. The treated water and diluted water in the large pond are pumped to large storage tanks for reuse in cooling and fire protection purposes.

Flame deflector cooling evaporates a high percentage of the water collected in the pond and tanks. This plus natural evaporation from the surface of the pond, normally makes it unnecessary to release water into Bell Canyon. However, when necessary, a California State Water Quality Board Resolution 58-77, supplemented with the issuance of a NPDES permit, allows controlled discharges. The location of this waterway is noted on the United States Geologic Survey Calabasas Quadrangle, latitude 34°, 12 ft, 30 in. north and longitude 118°, 41 ft west.

All water that is drained from any experimental area that might have propellants or chemicals as contaminants is retained and held in small ponds adjacent to that area. Rocketdyne maintains on-site, a fully equipped and professionally staffed analytical chemistry laboratory which provides expeditious analyses of water samples.

The retention pond receiving the Atomics International effluents is sampled at least weekly to determine the degree of contamination, if any, and neutralizing chemicals are added as necessary before the water is released to another on-site retention pond for additional dilution. Monthly samples are taken from these ponds by the Los Angeles Department of Water and Power and analyzed in their own lab.

When excess water is to be released from Rocketdyne property, the Los Angeles Department of Water and Power is notified of the time and amount of release, and their concurrence is obtained. During water release, samples are taken and sent to an independent analytical chemistry laboratory for analysis. The results of the analyses are then sent to the Regional Water Control Board 4 to verify that the released water meets the contamination limits set forth in Resolution 58-77, its amendments, and the NPDES Permit No. CA0001309.

## XX. WATER DISCHARGE PERMITS

All of the Atomics International's field laboratory waste water, surface runoff, industrial waters, and processed sanitary sewer discharge from the treatment facility flows directly to the Rocketdyne retention ponds. No water is discharged directly from AI property.

Regulation for the discharge of surplus waste water from the Rocketdyne retention ponds to the upper Los Angeles River is the National Pollutant Discharge Elimination System Permit (LA 0001309) acquired by Rockwell International's Rocketdyne Division for the entire Santa Susana Field Laboratory (SSFL). A copy of this permit is included in Appendix B.

## XXI. THERMAL WATER EFFLUENT MONITORING DATA

AI has undertaken no manufacturing processes associated with the SNM license requiring cooling water. Therefore, there is no identified need for a thermal water effluent monitoring program.

## XXII. MISCELLANEOUS ENVIRONMENTAL CATEGORIES

Material requested in response to the Interim Guidelines has been provided in Part A of this report.

## PART B REFERENCES

1. "Assumptions Used for Evaluating the Potential Radiological Consequences of a Loss of Coolant Accident for Boiling Water Reactors," Regulatory Guide 1.3, USAEC (June 1974)
2. "Technical Information in Support of the Atomics International Application for Broad Materials License," Staff, Health, Safety & Radiation Services Department, Atomics International, AI-68-145 (December 31, 1968)
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13. E. M. Mouradian and L. Baker Jr., "Burning Temperatures of Uranium and Zirconium in Air," Nuclear Science and Engineering, 15, 1963, 388
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## APPENDICES

**APPENDIX A**  
**EMERGENCY PLANS**

**NOTE**

**These plans are submitted as examples for information only.  
Revisions will not be provided.**

- Appendix A-1. Master Emergency Plan**
- Appendix A-2. Facility Emergency Plan – Outline**
- Appendix A-3. Facility Emergency Plan – Fuel Fabrication  
Area – Building 001 Canoga Complex**

APPENDIX A-1  
ATOMICS INTERNATIONAL DIVISION

MASTER EMERGENCY PLAN

April 1976

APPROVED:

*Horture* 4-15-76  
EMERGENCY COORDINATOR

*R. D. Barto* 4-15-76  
MANAGER, INDUSTRIAL SECURITY

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SERVICE ORGANIZATION

EMERGENCY PLAN

DIVISION POLICY AND ORGANIZATION

April 1976

APPROVALS:

*Flourens* 4-14-76  
EMERGENCY COORDINATOR

*R. D. Larto* 4-14-76  
MANAGER, INDUSTRIAL SECURITY

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A-1-5

## SECTION I

### DIVISION POLICY AND ORGANIZATION

Emergency Response Actions and Plans (SOP B-12) . . . Exhibit A.  
Civil Defense Warning (SOP B-30). . . . . Exhibit B.  
Incident Reporting (SOP B-22) . . . . . Exhibit C.  
Division Organization . . . . . Exhibit D.  
Finance and Administration Organization . . . . . Exhibit D-1.  
Industrial Security Organization. . . . . Exhibit D-2.

# Operating Policies

SOP B-12



Atoms International Division  
Rockwell International

Page 1 of 2

October 26, 1973

## EMERGENCY RESPONSE ACTIONS AND PLANS

### GENERAL

Any type of incident, anticipated or unexpected, requiring some degree of extraordinary action to protect life and/or property will be considered an emergency and will be governed in accordance with the provisions of this procedure.

All emergencies must be reported immediately to the Protective Services Control Center.

### EMERGENCY ACTION RESPONSIBILITIES

The Chief of Protective Services, or his delegate, will assume overall authority during periods of emergency and will determine when emergency action is to terminate. He will be responsible for emergency notification and will provide protective services relative to security for classified material, fire prevention and suppression, police protection, rescue and communications, and will maintain a Control Center as a focal point for these activities. Protective Services, through the Control Center, will coordinate the emergency response activities of Medical, Plant Services, Traffic, Health, Safety & Radiation Services (HS&RS), Public Relations, and all other functions. The Chief of Protective Services will request emergency services from outside agencies, when required, and will coordinate their activities while on company premises.

The heads of Plant Services, Medical, Traffic, HS&RS, and Public Relations will immediately report to, or maintain contact with, the facility Protective Services Control Center during emergencies. They will also immediately make ready all available manpower and equipment to handle conditions falling within their functional assignments.

Supervision is responsible for:

1. Compliance with instructions issued by the Chief of Protective Services.
2. Safe evacuation of employees when ordered.
3. Security of classified material.
4. Control of equipment, processes, and devices which could become hazardous.
5. Taking control of emergency situations within their immediate area and providing status reports to the Control Center.

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A-1-7

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Remove and destroy SOP B-12 dated April 30, 1971, and replace with this copy.  
Revised to delete the definitions and classifications of emergencies.

Exhibit A

EMERGENCY PLANS

Protective Services will develop and maintain an overall Emergency Plan. The objectives of the Emergency Plan will be to facilitate the coordination and direction of activities during an emergency so as to minimize or prevent damage to property and injury to personnel.

Protective Services will designate those service departments for which a Service Organization Emergency Plan must be prepared. Protective Services (with the advice and assistance of HS&RS) will also designate areas or facilities for which a Facility Emergency Plan must be prepared.

Facility Emergency Plans will be prepared by the concerned operating department and submitted for approval of HS&RS and final approval by the Chief of Protective Services. Service Organization Emergency Plans will be prepared by the concerned service department and submitted for approval by the Chief of Protective Services.

JT:jl

# Operating Policies

SOP B-30



Atoms International  
North American Rockwell

Page 1 of 2

January 27, 1971

## CIVIL DEFENSE WARNING

Activity at all AI facilities, during a Civil Defense warning, will be governed by this procedure. Deviation will be permitted only to comply with orders issued by local Civil Defense or other governmental agencies officially assuming jurisdiction during the alert.

All Civil Defense activity will be directed by Industrial Security from Protective Services Control Centers. In the event communication systems fail, the ranking member of supervision, in each area, will assume emergency control and execute the procedure set forth below.

### NOTIFICATION OF CIVIL DEFENSE WARNINGS AND INSTRUCTIONS

Civil Defense warnings will be received by the Protective Services Control Centers and announced by them through designated signal devices, such as fire horns, whistles, public address system, etc. Employees will be given instructions over the public address system and by area supervision.

### ATTACK WARNING - TAKE COVER

The "Take Cover" warning will be indicated by a signal of repeated short blasts of not less than one minute and/or an announcement on the public address system. When this occurs, employees will take action immediately as follows:

1. Shut down machinery and equipment as is done at the end of a shift. Follow special shutdown plan for hazardous operations, looking to supervision for guidance.
2. Properly put away classified material, personal and company property.
3. Make work area safe, clear aisles, protect flammable liquids, gases and chemicals.
4. Take cover in safest location in your work area unless specifically instructed otherwise. Use inside walls, under stairs and balconies, and enclosed office areas for protection. Stay clear of exterior glass and skylights. Authenticated civil defense instructions will be disseminated as received.
5. Employees who desire to leave the plant may do so and need not clock out.
6. Employees operating vehicles at locations too far away to return safely to a company plant at the sounding of the public attack warning, which is the rising and falling sound on local sirens, should park off main highways, secure load, and take best shelter possible, being guided by local civil defense instructions.

AI-76-21

### NEW ATOMICS INTERNATIONAL PROCEDURE A-1-9

Remove and destroy PSD H-515 dated October 1, 1969, and file this procedure in the SOP section of the manual. No policy/procedural changes.

Exhibit B...

Protection of facilities and handling of emergencies will be accomplished by designated on-shift personnel. All off-shift personnel with assigned emergency responsibilities should comply with local Civil Defense plans, and not attempt to reach the plant.

#### MANAGEMENT RESPONSIBILITIES

Those members of management who have been assigned action responsibilities in the master emergency plan will assemble at the Protective Services Control Centers during a Civil Defense warning and assist in directing emergency operations.

#### ALL CLEAR

"All Clear" will be indicated by alternate long and short signal blasts and/or public address announcements. When the all clear announcement is made:

1. Employees will be expected to return to work if the area is safe. When in doubt, consult with supervision.
2. Supervisors will instruct employees to check the safety of their equipment and work stations prior to resuming operations. If in doubt, supervisors will contact Health, Safety & Radiation Services for instructions before resuming work.

JT:jl

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A-1-10

# Standard Operating Policies



Atomics International Division  
Rockwell International

SOP B-22

Page 1 or 2

March 18, 1975

## INCIDENT REPORTING

### GENERAL

This SOP covers the methods and responsibilities for internal and external reporting of incidents.

For purposes of this procedure, an incident is an occurrence which involves significant, actual or potential property damage, property loss, personal injuries, fatalities, or disruption of work schedules. Examples of reportable incidents are fires, floods, explosions, thefts, earthquakes, bomb threats, sabotage, civil disturbances, and releases of radioactive or toxic substances and excessive personnel radiation exposures. Excluded from this procedure are damages to property resulting from fabricating difficulties, wear or deterioration in use, and property that is damaged or destroyed as a test objective.

### PROCEDURE

#### I. IMMEDIATE INTERNAL REPORTING TO THE INDUSTRIAL SECURITY CONTROL CENTER

- A. All incidents will be reported immediately by the cognizant personnel to the Industrial Security Control Center at the concerned site.
- B. Upon receipt of the incident report, the Control Center will, as necessary, immediately notify and initiate action by the emergency response functions (Health, Safety & Radiation Services, Protective Services police and fire protective functions, Medical, and others), and the manager of the affected operating department. The Control Center will also, as warranted by the nature of the incident, report the incident to the President - AI, the Vice President and Controller, and to AI functions such as Public Relations, Property Administration, and AI Insurance.

#### II. REPORTING OF INCIDENTS TO CUSTOMER OFFICES, GOVERNMENT AGENCIES, AND OTHER EXTERNAL POINTS

- A. Upon receipt of an incident report from the Control Center, and as sufficient information becomes available, Health, Safety & Radiation Services (HS&RS) will:
  1. In the case of a serious incident, immediately consult with the President - AI (or his representative) concerning notification plans and requirements.

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A-1-11

Remove and destroy SOP B-22 dated August 7, 1973, and replace with this copy. Revised to (1) clarify Control Center notification requirements; and (2) cover reporting requirements to the Corporate Offices.

EXHIBIT C

2. Report the incident (by telephone, telegram, or TWX) to Federal, State, or local government agencies or customer Contracting Offices as required by government or contractual safety regulations, or when otherwise deemed appropriate for maintenance of good relationships with such organizations concerning safety matters.
  3. Notify any concerned AI program manager (or his representative) of the incident and advise him of any immediate reports they have made or plan to make to external organizations.
  4. Submit subsequent, written, specific and periodic reports of incidents to Customer Offices and government agencies as required by government and contractual safety regulations.
- B. The President - AI, or his representative, as warranted by the seriousness of the incident, will immediately notify the Operations President and Corporate Executives and functions in accordance with Corporate Directive A-02.
- C. The AI Vice President & Controller - Finance & Administration, or his representative, will notify the Corporate Controller as required by Corporate Finance Policies.
- D. The AI program manager will, as necessary, immediately notify the customer's Program Management representative (an on-site representative, if available) or may request HS&RS to make such notification for him. The AI program manager will submit written incident reports to the customer's Program Management organization as required by contract or when otherwise deemed appropriate. Such reports must be coordinated with HS&RS prior to submittal to the customer. See also SOP M-80, Unusual Occurrence Reports - RRD Programs.
- E. Industrial Security will report incidents to law enforcement agencies and to the customer Contracting Office security function as required and, in the event a fatality occurs, will represent the company at any coroner's inquest.
- F. Employee Welfare is responsible for notification to the next of kin in the event of an employee fatality or serious injury. At Welfare's request, Industrial Security or the employee's supervisor may make such notifications.
- G. Public Relations is responsible for the notification to the next of kin in the event of a nonemployee fatality or serious injury when it is determined that the individual's employer has not done so. When requested by Public Relations, Industrial Security may make the notification.
- H. For any incident which might be covered under an insurance program, Finance (Insurance function) will provide immediate and written reports, as required, to the Insurance function (Corporate Offices). AI Insurance will coordinate with Industrial Security, Facilities & Industrial Engineering, HS&RS, and other functions in developing cost estimates, descriptions of losses, and other information required for such reports.

AI-76-21  
A-1-12



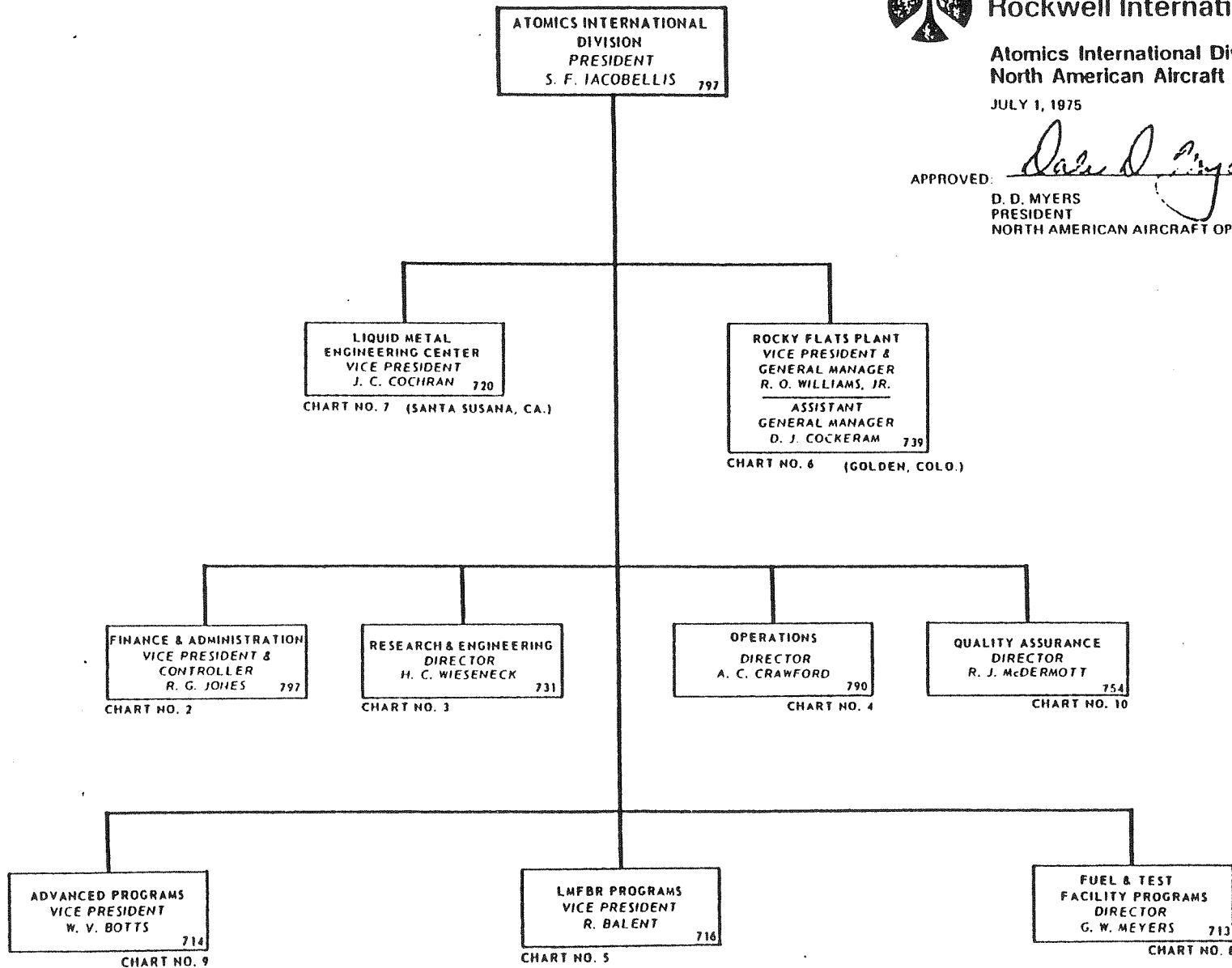
Rockwell International

Atoms International Division  
North American Aircraft Operations

JULY 1, 1975

APPROVED:

*D. D. Myers*  
D. D. MYERS  
PRESIDENT  
NORTH AMERICAN AIRCRAFT OPERATIONS



DELEGATION OF AUTHORITY IS UPWARD

AI-76-21  
A-1-13

EXHIBIT D

ATOMICS INTERNATIONAL  
(CANOGA PARK, CALIF.)



Rockwell International  
Atomics International Division

FINANCE AND ADMINISTRATION

*R. G. Jones*  
R. G. JONES  
VICE PRESIDENT & CONTROLLER

*S. F. Iacobellis*  
S. F. IACOBELLIS  
PRESIDENT

APPROVED: \_\_\_\_\_

AI-76-21  
A-1-14

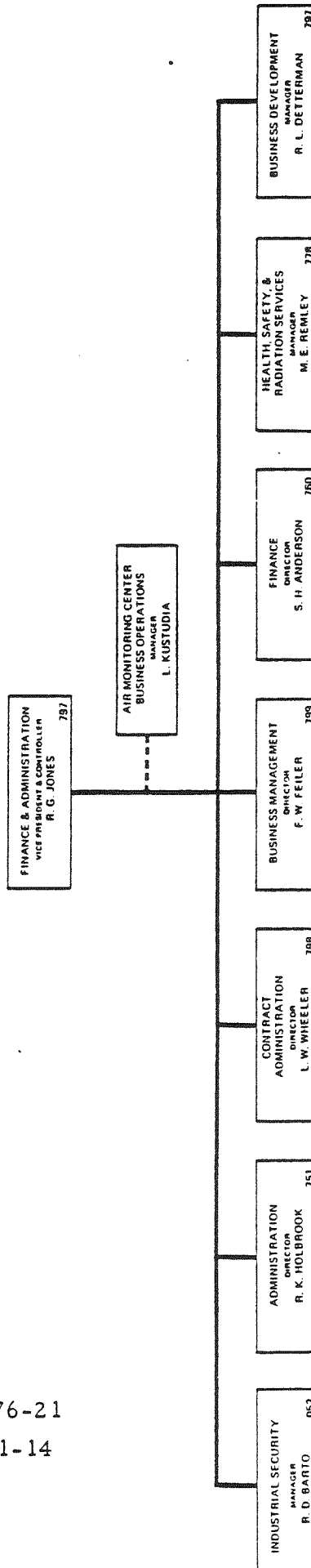


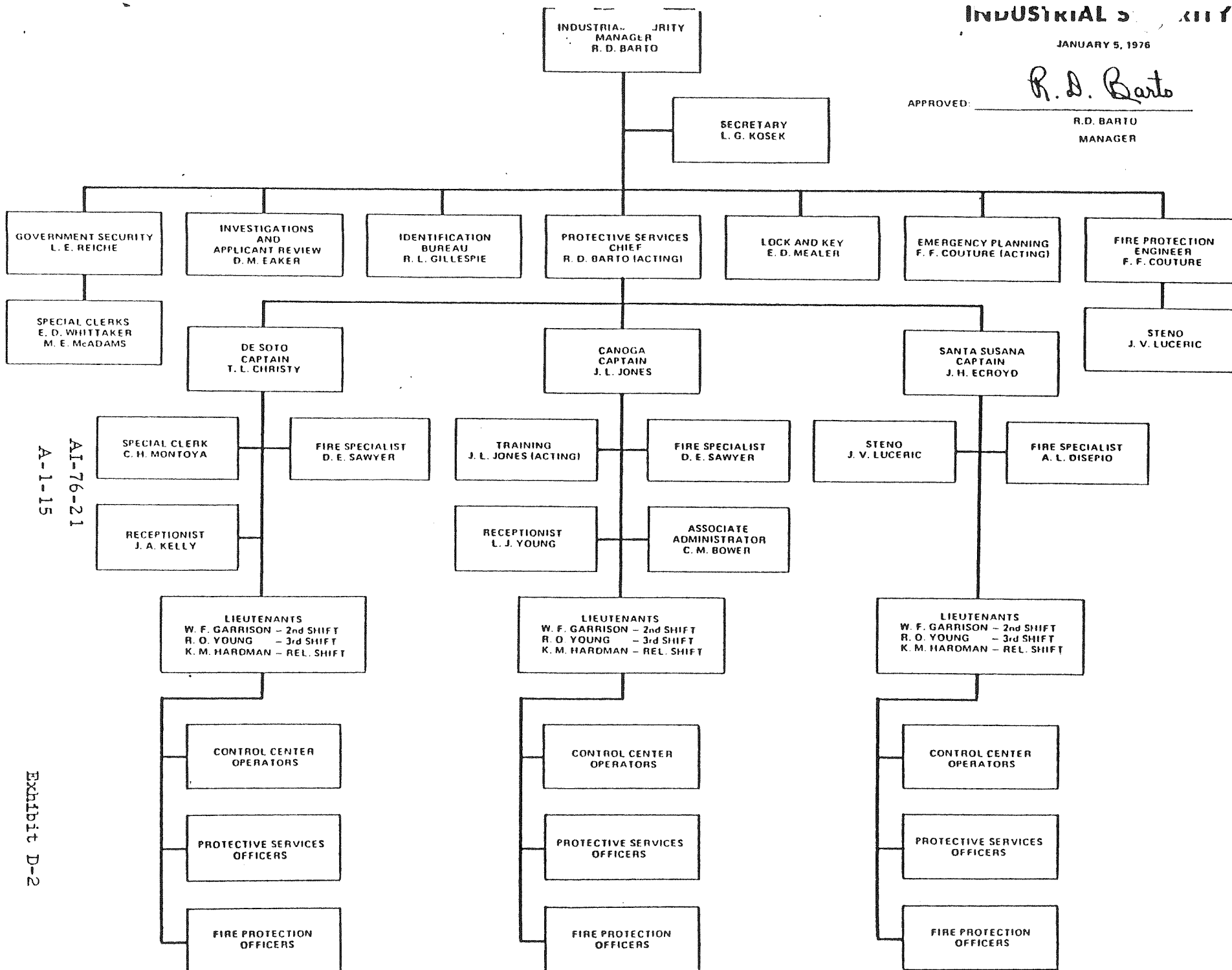
Exhibit D-1

JANUARY 28, 1976  
CHART NO. 2  
FINANCE AND ADMINISTRATION

JANUARY 5, 1976

R. D. Barto

APPROVED:

R.D. BARTO  
MANAGER

SERVICE ORGANIZATION

EMERGENCY PLAN

INDUSTRIAL SECURITY

April 1976

APPROVALS:

*J. H. Hunter* 4-14-76  
EMERGENCY COORDINATOR

*R. D. Barts* 4-14-76  
MANAGER, INDUSTRIAL SECURITY

AI-76-21

A-1-16

## SECTION II

### INDUSTRIAL SECURITY DEPARTMENT (Notifications)

#### I. RESPONSIBILITIES

- A. Maintain a current notification listing for designated Management, Customer, and Protective Services personnel together with outside emergency organizations.
- B. Monitor all communication equipment within the Control Center.
- C. Notify key Division, Corporate, and Customer Representatives.
- D. Contact City, County, State, and Federal Agencies.
- E. Maintain log and reports.

## II. ACTION PLANS

### A. BOMB THREATS

Upon receipt of bomb threat information, the Control Center Operator will notify:

1. Shift Commander
2. Manager of Industrial Security
3. Plant Supervisor, if known location of bomb or suspected area  
(include pertinent information)
4. Dispatch Protective Services personnel to assist Supervisor  
in search.
5. Emergency Coordinator
6. Management, Health, Safety and Radiation Services, Public  
Relations and Customer Representatives as requested by Shift  
Commander and/or Manager of Industrial Security
7. Federal Bureau of Investigation
8. Los Angeles Police Department - DeSoto  
Ventura County Sheriff's Office - SSFL
9. ERDA - SAN, Security Division

### B. CIVIL DEFENSE WARNING

Upon receipt of air raid warning, the Control Center Operator will:

1. Blue Alert
  - a. Notify Shift Commander
  - b. Manager of Industrial Security
  - c. Emergency Coordinator
  - d. Health, Safety and Radiation Services.

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A-1-18

As directed by the Shift Commander or Manager of Industrial Security, notify:

- e. Vice President/Finance & Administration
- f. Division President
- g. Public Relations
- h. Customer Representative
- i. Summon Protective Services assistance to Control Center
- j. Make no public address announcement.

2. Red Alert (Take Cover - Attack Imminent)

Upon receipt of Red Alert, Control Center Operator will:

- a. Verify that each Protective Services Control Center has received the alert.
- b. Make the following announcement over the public address system:

"YOUR ATTENTION PLEASE! YOUR ATTENTION PLEASE!"

This is the Protective Services Control Center. A RED Air Raid Warning signal has been received from Civilian Defense Headquarters. Please listen to the following instructions."

"Turn off machines and equipment as you would at the end of a shift. Properly put away all classified material, personal and Company property. Go to the safest location in your immediate work area and take cover, unless specifically instructed by your supervisor to do otherwise. Each supervisor will personally take care of all personnel in his immediate area."

"Please remember, if you insist upon leaving the plant, all avenues outside the plant may be very hazardous. Unless otherwise instructed by your supervisor, you may be safer

inside the plant. You will be notified immediately of any change in conditions."

- c. Dispatch Protective Services personnel to open regularly used vehicle and pedestrian gates if secured at time of alert.
- d. Assign available Protective Services personnel to man gates and maintain order in the facility.
- e. Notify Shift Commander
- f. Manager of Industrial Security
- g. Emergency Coordinator
- h. Vice President/Finance & Administration
- i. Division President
- j. Health, Safety and Radiation Services
- k. Public Relations
- l. Customer Representative

C. CIVIL DISTURBANCES

- 1. The senior Protective Services Supervisor on duty will, as required, direct the Control Center Operator to:
  - a. Notify the City of Los Angeles Police Department/Ventura County Sheriff's office.
  - b. Notify Manager of Industrial Security.
  - c. Emergency Coordinator.
  - d. Vice President/Finance & Administration.
  - e. Division President.
  - f. Health, Safety and Radiation Services.
  - g. Public Relations.

h. Customer Representative.

i. Obtain photographic and sound recording support.

D. CLOSING OF PLANT

1. Control Center Operator will notify designated Management and Customer personnel as directed by Division President, Vice President/Finance & Administration, Director of Personnel or Manager of Industrial Security.
  - a. Control Center Operator will announce or permit responsible Personnel Department Supervision or Public/Division Relations representative to announce appropriate information over the public address system.

E. EARTHQUAKES

1. Dispatch Protective Services personnel to the areas.
2. Summon Protective Services assistance to the Control Center.
3. Notify Plant Services.
4. Predicated upon information received from responding Protective Services personnel indicating degree of severity:
  - a. The Control Center Operator will, as required, make an incident announcement over the public address system.

Your attention please! This is the Protective Services Control Center. Employees will remain at their work stations if safe. If necessary, move to nearest safe location such as under work bench, table or stairway. Stay away from windows, overhead glass or loose objects.

Supervision will check immediate work areas, turn off

machines, account for employees under your control, report injuries, damage and need for assistance to the Control Center.

- b. Notify Los Angeles City Fire Department/Ventura County Fire Department.
- c. Shift Commander.
- d. Manager of Industrial Security.
- e. Emergency Coordinator.
- f. Health, Safety, and Radiation Services.
- g. Plant Services.

As directed by the Shift Commander or Manager or Industrial Security, notify:

- h. Vice President/Finance & Administration.
- i. Public Relations.
- j. Division President.
- k. Customer Representatives.
- l. Insurance Section.
- m. Property Administration Section.
- n. Instruct Protective Services personnel assigned to facility re-entry gates to detain arriving employees at the gate until advised to the contrary.

F. EVACUATION OF PERSONNEL

- 1. As directed by the Shift Commander, the Control Center Operator will make a public address announcement as follows:

"It is necessary to evacuate (identify area and facility buildings). Safety machines and equipment and secure classified material. Wait outside the evacuation area for further instructions."

H. FUEL, ELECTRICAL, CHEMICAL INCIDENTS

Upon receipt of report of incident, the Control Center Operator will:

1. Dispatch Protective Services personnel.
2. Notify Shift Commander.
3. Notify Plant Services.
4. Predicated upon information received from responding Protective Services personnel indicating degree of severity:
  - a. Cause area personnel to leave hazardous area
  - b. Assign Protective Services personnel to control and protect area
  - c. Notify City of Los Angeles Fire Department/Ventura County Fire Department
  - d. Manager of Industrial Security
  - e. Emergency Coordinator
  - f. Health, Safety and Radiation Services
  - g. Vice President/Finance & Administration
  - h. Division President
  - i. Public Relations
  - j. Customer Representative
  - k. Insurance Section
  - l. Property Administration Section

I. RADIATION INCIDENT

Upon receiving a radiation incident report or alarm, the Control Center Operator will:

1. Automatic alarm -- Action starts at Item
  - a. Verbal alarm -- Activate radiation alarm for area of incident.

2. Dispatch Protective Services personnel with special re-entry equipment.
3. Make Facility P/A announcement of incident.
4. Notify Health, Safety and Radiation Services.
5. Shift Commander.
6. Control Centers.
7. Manager of Industrial Security.
8. Emergency Coordinator.
9. Public Relations.

J. RECALL OF PROTECTIVE SERVICES PERSONNEL

As directed by the Shift Commander, notify Protective Services Personnel to report for duty.

K. SERIOUS ILLNESS/INJURY INCIDENT

Upon notification, the Control Center Operator will:

1. Dispatch ambulance.
2. Notify Plant Hospital/First Aid Station.
3. Shift Commander.
4. Health, Safety and Radiation Services.
5. Manager of Industrial Security.
6. Emergency Coordinator.
7. Public Relations.
8. Insurance Section.
9. Property Administration Section.

L. SEVERE WEATHER

1. During periods of extreme or severe weather, the Control Center will monitor radio weather reports, obtain forecasts from Company Meteorology Unit, and if appropriate, contact

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Law Enforcement Agencies for weather data and information regarding hazardous areas.

2. Should weather reports indicate the existence of extraordinarily hazardous highway conditions, advise the senior Protective Services Supervisor on duty for determination of action to be taken.

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A-1-26

SERVICE ORGANIZATION

EMERGENCY PLAN

PROTECTIVE SERVICES

April 1976

APPROVALS:

*Flaureau* 4-17-76  
EMERGENCY COORDINATOR

*R. D. Barto* 4-14-76  
MANAGER, INDUSTRIAL SECURITY

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A-1-27

SECTION III  
PROTECTIVE SERVICES

- I. Responsibilities
- II. Action Plans
  - A. Bomb Threats
  - B. Civil Defense Warning
  - C. Civil Disturbances
  - D. Closing of Plant
  - E. Earthquakes
  - F. Evacuation of Personnel
  - G. Fires - Explosions
  - H. Fuel, Electrical, and Chemical Incidents
  - I. Radiation Incidents
  - J. Recall of Protective Services Personnel
  - K. Serious Illness/Injury Incidents
  - L. Severe Weather

SECTION III  
PROTECTIVE SERVICES

I. RESPONSIBILITIES

- A. Assume overall control and direction of emergency activity.
- B. Provide necessary instructions to personnel.
- C. Maintain liaison with senior Division Management, Corporate Officials and Customer Representatives.
- D. Maintain physical security and personnel control.
- E. Regulate evacuation of personnel.
- F. Maintain traffic control.
- G. Establish and maintain emergency communication systems.
- H. Conduct fire fighting and rescue operations.
- I. Provide police protection.
- J. Conduct necessary investigations.
- K. Provide assistance to other emergency services.
- L. Ensure protection of classified information.
- M. Document and report emergency activities.
- N. Preservation of scene of serious incident.

## II. ACTION PLANS

### A. BOMB THREATS

1. Decide whether to evacuate building or threatened area.
2. Search for bomb.
3. If the bomb or strange object is found, report location and description to the Control Center. Clear the area and block it off for at least 300 feet. Include areas above and below. Open doors and windows to minimize containment of possible blast. Do not use two-way radios (walkie-talkie) as this can detonate electrically operated blasting caps.

### B. CIVIL DEFENSE WARNING

1. Check on communication systems. Monitor radio for emergency information. Provide information and instructions to Company personnel and others as feasible.
2. Activate radiological monitoring station.
3. Continuously assess situation particularly for radio-activity and fire hazards.
4. Keep employees advised.

### C. CIVIL DISTURBANCES

1. Division Policy relating to civil disturbances is that of maintaining the protection of personnel and property while avoiding unnecessary confrontation with demonstrators and other dissidents.
2. The senior Protective Services Supervisor on duty will direct the Control Center Operator to make predetermined notifications.
3. Determine juristical status of demonstration area. Consult with appropriate legal advisors.

4. If informed of proposed demonstration, Management may elect to invite leaders to discuss problems and plans for joint control of the situation.
5. Assess the situation; insure adequate forces are available; increase patrols; and avoid over-reaction.
6. Heed advice and report from local police.
7. A complaint to the local Law Enforcement Agency shall be made immediately in the event of trespass, destruction of property, fighting or other acts of vandalism.

D. CLOSING OF PLANT

1. Determination for closing of the plant will be made by the Division President, Vice President/Finance & Administration, the Director of Personnel or the Manager of Industrial Security.
  - a. Protective Services personnel at regularly manned gates will advise personnel reporting for work the plant has been closed, together with other information as determined by the Director of Personnel.
  - b. The senior Protective Services Supervisor on duty shall establish Protective Services' activities based upon normal holiday schedule.

E. EARTHQUAKES

1. Assess situation particularly utility damage and fire and other hazards.
2. Effect emergency operations. Determine needs for additional manpower, equipment, and supplies.
3. Determine priorities for firefighting, rescue, handling casualties, and handling spillage of chemicals, utility-line breakage and other immediate requirements.

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4. If necessary, request mutual aid, in accordance with agreements.
5. Allow only authorized personnel in damaged area.
6. Cordon off the area of rescue, fire and other hazardous operations. Reroute traffic as required. Effect a strict "No Smoking" ban in damaged areas.
7. Keep facility personnel informed of situation to allay fear, avert rumors and panic, and for safety reasons. Advise employees of such threats as aftershocks and of emergency actions being taken or to be taken.
8. Inspect all buildings and other structures for damage and hazards. Evacuate personnel to safe areas as required. Cordon off or demolish damaged structures as necessary.

F. EVACUATION OF PERSONNEL

1. Evacuation of personnel from Division facility(s) will be ordered by the senior Protective Services Supervisor on duty. Based upon the necessity for expediency of a specific existing situation, the senior Protective Services Supervisor on duty will determine the appropriateness of receiving concurrence from the Division President, Vice President/Finance & Administration, Director of Personnel or Manager of Industrial Security prior to evacuation of personnel.
  - a. Dispatch Protective Services personnel to open regularly used vehicle and pedestrian gates if secured at time of alert.
  - b. Assign available Protective Services personnel to man gates and maintain order in the facility.

G. FIRES - EXPLOSIONS

1. Assess situation, determine area affected or to which fire

might spread, and estimate speed and direction of wind.

2. Initiate reporting from all buildings in risk area.
3. Keep in touch with Control Center.
4. Provide information on strategy, tactics, need for additional manpower, equipment, and supplies.
5. Keep employees informed of situation and actions being taken or to be taken.
6. Evacuate risk areas as necessary. Designate exit routes for employees and entrance routes for emergency services.
7. Enlarge area of evacuation if situation requires.

#### H. FUEL, ELECTRICAL, AND CHEMICAL INCIDENTS

1. Determine type of equipment, fuels, or chemicals involved.  
Call for advice or assistance as necessary.
2. Restrict entry into the danger zone.
3. Rescue injured or trapped persons; evacuate area as necessary, particularly downwind.
4. If chemicals involved cannot be identified and hazards are unknown, fight any resulting fires as though the chemicals were toxic and likely to have explosive reactions.
5. If decontamination of area is necessary, wash it down or use other prescribed methods.
6. Keep employees informed of the situation.

#### I. RADIATION INCIDENT

1. Rescue injured or trapped persons and remove them from the area. Administer first aid; evacuate other personnel as necessary.
2. Check persons involved for exposure to radiation.

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A-1-33

3. Inform ambulance personnel who will be in contact with injured persons of their possible contamination with radioactive material.
4. Limit entry into danger zone to emergency service personnel. Do not allow contact with debris resulting from the incident until it can be monitored for radioactivity.
5. In firefighting keep upwind to the extent possible; and avoid smoke, fumes, and dust.
6. Do not eat, drink, or smoke in the incident area, or use food or drinking water that may have been contaminated with radioactive material.
7. Obtain names and addresses of all persons involved, for follow-up radiation and health checks. If decontamination is required, the work shall be directed by a radiological specialist.

J. RECALL OF PROTECTIVE SERVICES PERSONNEL

1. The senior Protective Services Supervisor on duty may authorize the recall of off-duty personnel based upon his assessment of emergency or potential emergency condition. A current listing by classification of Protective Services personnel, with home telephone numbers, is maintained in the Protective Services Control Center.

K. SERIOUS ILLNESS/INJURY INCIDENT

1. Assess the situation. If necessary, restrict and control incident area.
2. Assist in handling medical care problems including treating the injured at the scene.
3. Coordinate activities with ambulance and hospital services.

L. SEVERE WEATHER

1. Should weather reports indicate the existance of extraordinary hazardous highway conditions, the senior Protective Services Manager on duty will determine action to be taken.
2. Under no conditions will employees be sent home, or off duty personnel be advised to remain at home without the approval of the Division President, Vice President/Finance & Administration, Director of Personnel or Manager of Industrial Security.

SERVICE ORGANIZATION

EMERGENCY PLAN

MEDICAL

April 1976

APPROVALS:

*L. H. Hanson*  
MEDICAL DIRECTOR

*Structure* 4-13-76  
EMERGENCY COORDINATOR

*R. D. Barts* 4-13-76  
MANAGER, INDUSTRIAL SECURITY

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A-1-36

## SECTION IV

### MEDICAL

#### I. Responsibilities

#### II. Action Plans

##### A. Bomb Threats

Civil Defense Warning

Civil Disturbances

Severe Weather

##### B. Earthquakes

##### C. Fires - Explosions

##### D. Fuel, Electrical, Chemical Injuries

##### E. Radiation Incidents

##### F. Serious Illness/Injury Incident

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## SECTION IV

### MEDICAL

#### I. RESPONSIBILITIES

- A. Assume control and direction of emergency medical activity.
- B. Establish liaison with appropriate division and corporate departmental representatives.
- C. Coordinate medical activity with proper public and private medical care providers.
- D. Provide medical care instructions to all available personnel.
- E. Assure that all necessary medical supplies and equipment are available.
- F. Arrange for evacuation of injured personnel to appropriate medical facilities.
- G. Provide assistance to other emergency medical providers.
- H. Document all injuries and treatment administered.

## II. ACTION PLANS

### A. BOMB THREATS

#### CIVIL DEFENSE WARNING

#### CIVIL DISTURBANCES

#### SEVERE WEATHER

Medical action in the event these incidents which are indicative of potential bodily injury to personnel shall consist of preparation to treat medically the anticipated types of injury. All medical department personnel will be assigned to appropriate areas of responsibility and initial lines of communication with other public and private medical facilities will be established.

### B. EARTHQUAKES

1. Comply with requests and instructions from Industrial Security regarding personal safety and provision for safety of equipment.
2. Prepare for medical care of traumatic injuries, cardiovascular illness and acute psychiatric emergencies.
3. Establish communication with appropriate public and private medical facilities.
4. Provide emergency care as needed and arrange for transportation and appropriate definitive medical care of the seriously ill and injured.

### C. FIRES - EXPLOSIONS

1. Prepare for emergency medical care of traumatic, ophthalmologic and thermal injuries.
2. Establish communication with appropriate public and private medical facilities.

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A-1-39

3. Provide proper emergency care of injuries and arrange transportation and provision of definitive medical care of injuries.

D. FUEL, ELECTRICAL, CHEMICAL INJURIES

1. Prepare for emergency medical care of contact, thermal, neurologic, cardiovascular, pulmonary, ophthalmologic and traumatic injuries and illness.
2. Establish communication with appropriate public and private medical facilities.
3. Provide proper emergency care of injuries and illness and arrange transportation and provision of definitive medical care.

E. RADIATION INCIDENTS

1. Prepare for emergency medical care of traumatic, thermal and systematic radiation injury and illness.
2. Establish communication with appropriate public and private medical care facilities.
3. Coordinate evaluation of extent of radiation exposure with Health, Safety and Radiation personnel.
4. Arrange opening and preparation of decontamination facility Building 005, SSFL.
5. Commence proper decontamination measures on exposed personnel in conjunction with appropriate medical care of associated injuries.
6. Arrange for longer term care of severely contaminated personnel under guidelines established by ERDA. Coordinate with public and private medical facilities the admission of such personnel as contamination levels reach levels allowing such transfer.

7. Coordinate with Health, Safety and Radiation personnel the disposal of all clothing, supplies and materials considered radioactively contaminated.

F. SERIOUS ILLNESS/INJURY INCIDENT

1. Prepare for emergency treatment of the classification of injury/illness anticipated, if available from Control Center Operator.
2. Establish communication with appropriate public or private medical care facility.
3. Provide proper emergency care of person or persons involved and arrange, when needed, transportation and provision of further definitive medical care.

# Internal Letter



Rockwell International

Date . 17 February 1976

No.

TO . Industrial Security Supervision  
Address . 052 - All Locations

FROM . R. D. Barto  
Address . 052 - 055, AA89

Phone . 2355

Subject . Ambulance/Hospital Use - (SUPERSEDES ALL PREVIOUS COMMUNICATIONS)

Contact for ambulance service or hospital use will be made in the order listed, in accordance with availability:

## AMBULANCE SERVICE:

### DeSoto/Canoga

1. LAFD	785-2151
2. Snyder	785-3133
3. Schaefer's	781-0922

### Santa Susana

1. Rocketdyne	
2. Brady's	(805) 527-1133
3. Snyder	785-3133
4. Schaefer's	781-0922

(NOTE: Request radiation cases to be transported to West Hills Hospital).

## HOSPITAL USE:

<u>Name</u>	<u>Phone</u>	<u>Address</u>
1. West Hills	884-7060	7500 Medical Center Drive, Canoga Park
2. West Park	340-0580	22141 Roscoe Boulevard, Canoga Park
3. Northridge	885-8500	18300 Roscoe Boulevard, Northridge.

*F. F. Couture*

F. F. COUTURE  
Emergency Coordinator

APPROVED: *L. J. Johnson*

L. J. JOHNSON  
Medical Director

APPROVED: *R. D. Barto*

R. D. BARTO  
Manager  
Industrial Security

RDB/lgk

CC: Control Center Operators - All Locations

Files: R-31-19

R-31-51

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A-1-42

SERVICE ORGANIZATION

EMERGENCY PLAN

PUBLIC RELATIONS

April 1976

APPROVALS:

*H. J. Toher*  
MANAGER, PUBLIC RELATIONS

*F. Hunter 4-14-76*  
EMERGENCY COORDINATOR

*R. D. Barts 4-14-76*  
MANAGER, INDUSTRIAL SECURITY

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SECTION V  
PUBLIC RELATIONS

- I. Responsibilities
- II. Action Plans

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SECTION V  
PUBLIC RELATIONS

I. RESPONSIBILITIES

- A. All public release of premeditated oral information.
- B. All public release of written information.
- C. All public release of visual information.
- D. All public release of graphic information.

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## II. ACTION PLANS

- A. All contacts with news media and public inquiries will be handled only by Public Relations. Under no circumstances will employees receive, answer or contact news media or handle public inquiries without prior Public Relations approval. Written requests from news media or the general public for information or assistance will be referred to Public Relations for action.
- B. News media representatives who visit any Division location must be accompanied by Public Relations personnel at all times while on Company premises.
- C. Interviews (by visit or telephone) by news media representatives must have the prior approval of Public Relations.

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A-1-46

FACILITIES AND INDUSTRIAL ENGINEERING MANUAL

Bulletin No. 8  
May 6, 1975  
Revised

SUBJECT: PLANT SERVICE 24-HOUR EMERGENCY CALL LIST  
SUPERVISION

The following list of personnel are grouped by location according to area of responsibility:

Department 766 - DeSoto Facility

R. G. Aubuchon, Manager, Plant Services 1st Shift - Mechanical & A/C	344-5357
T. N. Barbian, Manager, Plant Services 1st Shift - Electrical & Bldg. Maintenance & Modification	805-526-1201
J. O'Brien, Manager, Plant Services 2nd Shift - Electrical & Janitorial	349-1514
F. Aguirre, Maint. Engineer, Plant Services	887-0249
M. C. Cranstone, Maint. Eng., Plant Services	346-8769
J. L. Bunch, Manager, Plant Services	No Phone
R. W. Hartzler, Manager, Facilities & Industrial Engineering	886-0039

Emergency contact during normal first and second shift operations are to be with supervision on site.

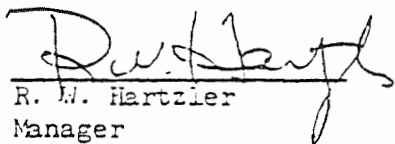
R. W. Hartzler, Manager, Facilities and Industrial Engineering, will be notified in all cases of :

1. Power Outage
2. Incidents involving damage to property and/or personnel injuries.
3. Other incidents determined by Control Center operator to be of major significance.

If Control Center is not able to contact any of the above listed supervision, craftsmen may be called directly by Control Center in their listed areas of responsibility.

See Plant Services 24-Hour Emergency Call List (Craftsmen).

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R. W. Hartzler  
Manager  
Facilities and Industrial Engineering


SERVICE ORGANIZATION

EMERGENCY PLAN

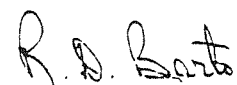
HEALTH, SAFETY & RADIATION SERVICES

April 1976

APPROVALS

 4-14-76  
HEALTH, SAFETY & RADIATION SERVICES

 4-13-76  
EMERGENCY COORDINATOR

 4-13-76  
MANAGER, INDUSTRIAL SECURITY

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## SECTION VI

### Health, Safety, and Radiation Services

#### I. Responsibilities

#### II. Action Plans

A. Bomb Threats, Civil Defense Warning, Civil Disturbance,  
Severe Weather

B. Earthquakes

C. Serious Illness/Injury Incident

D. Radiation Incidents

(1) Radiation Source

(2) Radioactive Contamination

(3) Criticality Accident

E. Evacuation of Personnel

F. Notification Requirements

Section I  
Health, Safety and Radiation Services

I. Responsibilities

- A. Assume control and direction of emergency activities involving operations of Radiation and Nuclear Safety, Industrial Hygiene and Safety, and Nuclear Materials Management.
- B. Instruct personnel in appropriate actions.
- C. Provide Emergency Re-entry Team members as required.
- D. Provide monitoring and survey instruments.
- E. Establish liaison with appropriate division and corporate management.
- F. Provide required notification to regulatory agencies.
- G. Assist with medical treatment.
- H. Provide approval for resumption of normal operations in the affected area.
- I. Document and report exposures and related consequences of an incident.
- J. Investigate cause of incident and recommend remedial action.

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## II. Action Plans

- A. Bomb Threats  
Civil Defense Warning  
Civil Disturbances  
Severe Weather

Review the potential hazards according to the situation and affected facilities. Preparations to respond to these hazards shall be made.

- B. Earthquakes, Fires, - Explosions

Inspect facilities for actual and potential hazards following a serious earthquake, fire, or explosion. Assist in elimination of any detected hazards.

- C. Fuel, Electrical, Chemical Injuries

Review cause of injury and recommend actions to prevent recurrence.

Serious Illness/Injury Incident

1. Determine if illness/injury may have resulted from hazardous conditions.
2. Provide for prevention of recurrence.
3. Assist in elimination of hazard.

- D. Radiation Incidents

### D 1. Radiation Source

In the event of excessive radiation levels resulting from an exposed radiation source:

1. Establish appropriate exclusion area
2. Determine if any personnel over-exposures
3. Assist in planning and performance of recovery operations.

### D 2. Radioactive Contamination

In the event of uncontrolled radioactive contamination:

1. Establish appropriate exclusion area and specify necessary protective clothing and equipment.

2. Monitor for airborne contamination.
3. Assist in planning and performance of recovery operations.

#### D 3. Criticality Accident

In the event of an indicated criticality accident:

1. Determine possible personnel exposure to neutrons by checking film badges for activations.
2. Participate in initial re-entry.
3. Determine if accidental criticality occurred and if so, estimate continuing hazard.
4. Retrieve nuclear accident dosimeters (NAD's) if safe to do so.
5. Following completion of initial re-entry, assist in planning appropriate further actions.

#### E. Evacuation of Personnel

Following evacuation of personnel from an area in which significant quantities of SNM are handled:

1. Conduct survey as required to detect diverted SNM
2. Perform other operations as necessary to assure that no SNM has been diverted.

#### F. Notification Requirements

1. In the case of a serious incident, consult with the President-AI (or his representative) concerning notification plans and requirements.
2. Report the incident (by telephone, telegram, or TWX) to Federal, State, or local government agencies or customer contracting offices as required by government or contractual safety regulations, or when otherwise deemed appropriate for maintenance of good relationships with such organizations.
3. Notify any concerned AI program manager (or his representative) of the incident and advise him of any immediate reports that have been made or are planned to make to external organizations.
4. Submit subsequent, written, specific and periodic reports of incidents to Customer Office and government agencies as required by government and contractual safety regulations.

5. Notification of the following regulatory agencies will be made according to Table I.

For operations licensed by the Nuclear Regulatory Commission (NRC):

Nuclear Regulatory Commission  
Region V  
1990 North California Boulevard  
Walnut Creek Plaza, Suite 202  
Walnut Creek, California 94596  
Telephone (415) 486-3141

For operations licensed by the State of California:

Radiologic Health Section  
State Department of Health  
714 P Street  
Sacramento, California 95814  
Telephone (916) 322-2073

For operations conducted under direct contract to the Energy Research and Development Administration (ERDA):

San Francisco Operations Office  
1533 Broadway  
Oakland, California  
Telephone (415) 273-7963

TABLE I.

NOTIFICATION OF INCIDENTS OR OCCURRENCES INVOLVING RADIATION

		<u>Incident Notification</u>		
		NRC Licensee	ERDA Contractor	California Licensee
A. Serious incident involving radioactive materials or radiation producing equipment. (Immediate notification required.)				
1. For NRC Licensees and/or ERDA Contractors:				
(a)	Loss or theft of licensed radioactive material.	X	X	X
(b)	Exposure of individual's whole body to 25 rem or more.	X	X	X
(c)	Exposure of individual's skin to whole body to 150 rem or more.	X	X	X
(d)	Exposure of individual's hand/forearms, or feet/ankles to 375 rem or more.	X	X	X
(e)	Release of radioactive materials in concentrations which, if averaged over twenty-four hours, would exceed 5000 times the limits specified in Appendix B. Table II of Title 10CF20 (or comparable limits of ERDA Manual or CAC 17).	X	X	X
(f)	Incident may result in loss of one or more weeks of the operation of any facility.	X	X	X
(g)	Damage to property may exceed \$100,000.	X	X	X
2. In addition to the above, the following applies <u>only</u> to ERDA installations and prime contractors:				
(a)	Any incident involving an atomic weapon resulting in injury or damage to private property.		X	
(b)	Any notice that an individual may have received 25 rem or more in a calendar year.		X	

TABLE I.  
NOTIFICATION OF INCIDENTS OR OCCURRENCES INVOLVING RADIATION

	Incident Notification		
	NRC Licensee	ERDA Contractor	California Licensee
(c) Any injury or illness diagnosed by an MD competent in nuclear medicine as having conceivably resulted from cumulative or massive radiation exposure.		X	
(d) Allegations that ex-employees of NRC, ERDA, or its contractors are disabled as a result of exposure to toxic materials or radiation related to atomic energy operations.		X	
(e) Any injury or industrial illness of five or more persons in ERDA operation.		X	
(f) Any accident or radiation exposure which creates a significant public relations problem.		X	
B. Reportable Accident (24 hour notification required) - Licensed Activities			
1. Exposure of individual's whole body to 5 rem or more.	X		X
2. Exposure of individual's skin of whole body to 30 rem or more.	X		X
3. Exposure of individual's hand/forearms or feet/ankles to 75 rem or more.	X		X
4. Release of radioactive materials in concentrations which, if averaged over twenty-four hours, would exceed 500 times the limits specified in Appendix B, Table II, Title 10CFR20 (or comparable limits in CAC 17).	X		X
5. Incident may result in loss of one or more workdays of operation of any facility.	X		X
6. Property damage may exceed \$1,000.	X		X
7. Incident may not result in any of the above, but may create serious public relations problems.		* AI-76-21 A-1-55	Page 6

NOTE: NRC does not require notification, but informing them should be considered.

TABLE I  
NOTIFICATION OF INCIDENTS OR OCCURRENCES INVOLVING RADIATION

Incident Notification			
	NRC Licensee	ERDA Contractor	California Licensee
8. Any off-site accident involving vehicles carrying ERDA shipments of radioactive materials.		X	
C. Reportable Occurrences (Notification in writing required within 30 days)			
1. Radiation exposure of any individual in excess of limits specified in 10CFR20 or NRC license conditions, or CAC 17.	X		X
2. Radiation levels or radioisotope releases into unrestricted areas which have not resulted in excessive exposures, but have been in excess of ten times any applicable limit, set forth in 10CFR20 or the conditions specified in an NRC license.	X		X
3. Bodily injury, property damage or claim connected with the possession or use of radioactive material at a facility or in the course of transportation which would pertain to an indemnity agreement between the licensee and the NRC.	X		
D. Reportable Accident (72 hours notification) - ERDA Facility Operations only.			
1. 5 rem or more to whole body in one calendar quarter.		X	
2. 30 rem or more to skin or thyroid in one calendar quarter.		X	
3. 75 rem or more to hands/forearms or feet/ankles in one calendar quarter.		X	
4. Any radiation exposure which causes an individual cumulative dose to exceed 5 (N-18) whole body.		X	
5. Any internal body deposition of radioactive material where (on the basis of a small number of early biological assay results) the estimated exposure averaged over a period of one year will exceed the limits as defined in ERDA Manual 0524.		X	

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OTE: Actual notification procedures shall be described in AI SOP No. B-22 "Incident Reporting."

Internal Letter

Rockwell International

August 22, 1975

R. D. Barto  
055 052 AA89

FROM R. J. Tuttle  
071 779 NB13

2726

Radiation and Nuclear Safety Emergency Call Lists

Updated call lists for radiological emergencies have been prepared and are attached for your information and use. These lists are established according to area and function:

- List 1 For emergencies at AI-HQ
- List 2 For Building 55 at Santa Susana
- List 3 For Building 20 and the RMDF (T021, T022) at Santa Susana
- List 4 For all other areas at Santa Susana
- List 5 For any incident involving a plutonium-contaminated wound
- List 6 For any incident involving an accidental criticality

*R. J. Tuttle*  
R. J. Tuttle, Manager  
Radiation & Nuclear Safety

M. E. Remley *M. E. Remley*

RJT:cm  
Attachments (2)

cc:	D.J. Aubuchon	788 KB47	L. Johnson	779 NB13
	E.L. Babcock	731 T020	L.J. Johnson 055	056 EA08
	F.H. Badger	779 T020	R.G. Jones	797 LA06
	L. Baurmash	716 LB10	J.P. Klostermann	779 T483
	F.E. Begley	779 NB13	W.H. Knight	754 KB46
	S.M. Bradbury	779 T055	W.R. McCurnin	731 T020
	D.C. Campbell	731 NB11	J.D. Moore	779 NB13
	J.W. Carroll	731 T055	C.L. Nealy	737 NB06
	<u>F.F. Couture 055</u>	<u>052 AA89</u>	R.K. Owen	779 T034
	W.L. Dias	788 KB47	M.E. Remley	778 NB08
	J.H. Ecroyd 055	052 SS12	E.L. Roddy	778 NB13
	R.R. Garcia	779 NB13	V.J. Schaubert	779 NB10
	✓ W.F. Garrison 055	052 MA11	R.J. Tuttle	779 NB13
	J. Harris	731 T034	P.S. Vandervort	720 T027
	W.F. Heine	713 NB02	J.H. Walter	731 T009

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PROTECTIVE SERVICES  
OFFICE

AUG 27 1975

# RADIATION AND NUCLEAR SAFETY

## EMERGENCY CALL LISTS

When emergency notification is required, calls should be placed in descending order from the proper list, beginning with the first name, until someone is contacted.

<u>List 1</u> AI-HQ	<u>List 2</u> T055	<u>List 3</u> T020, RMDF
1. R.R. Garcia X1329 341-3721	1. S.M. Bradbury X6492 (805) 522-5998	1. F.H. Badger X6585 994-5683
2. J.P. Klostermann X6140 345-5598	2. R.K. Owen X6541 349-0794	2. R.K. Owen X6541 349-0794
3. R.K. Owen X6541 349-0794	3. J.P. Klostermann X6140 345-5598	3. S.M. Bradbury X6492 (805) 522-5998
4. J.D. Moore X1320 (805) 487-2880	4. F.H. Badger X6585 994-5683	4. J.P. Klostermann X6140 345-5598
5. F.E. Begley X1320 349-0593	5. R.R. Garcia X1329 341-3721	5. R.R. Garcia X1329 341-3721
6. R.J. Tuttle X2726 785-8787	6. J.D. Moore X1320 (805) 487-2880	6. J.D. Moore X1320 (805) 487-2880
7. F.H. Badger X6585 994-5683	7. R.J. Tuttle X2726 785-8787	7. R.J. Tuttle X2726 785-8787
8. L. Johnson X1329 480-1830	8. L. Johnson X1329 480-1830	8. F.E. Begley X1320 349-0593
9. E.L. Roddy X2727 347-5655	9. F.E. Begley X1320 349-0593	9. L. Johnson X1329 480-1830
10. M.E. Remley X2238 349-6667	10. W.F. Heine X2746 998-8743	10. E.L. Roddy X2727 347-5655
11. W.F. Heine X2746 998-8743	11. M.E. Remley X2238 349-6667	11. M.E. Remley X2238 349-6667
12. V.J. Schaubert X1691 340-5629	12. E.L. Roddy X2727 347-5655	12. W.F. Heine X2746 998-8743
	13. V.J. Schaubert V1691 340-5629	13. V.J. Schaubert X1691 340-5629

# RADIATION AND NUCLEAR SAFETY EMERGENCY CALL LISTS

When emergency notification is required, calls should be placed in descending order from the proper list, beginning with the first name, until someone is contacted.

<u>List 4</u>	<u>List 5</u>	<u>List 6*</u>
1. Other Santa Susana Areas	Pu Wounds	Accidental Criticality <u>Analytical Chemistry</u>
1. R.K. Owen X6541 349-0794	1. S.M. Bradbury X6492 (805) 522-5998	1. C.L. Nealy X2646 888-9743
2. F.H. Badger X6585 994-5683	2. R.K. Owen X6541 349-0794	2. L. Baurmash X1325 348-2033
3. S.M. Bradbury X6492 (805) 522-5998	3. J.P. Klostermann X6140 345-5598	<u>Radiation &amp; Nuclear Safety</u>
4. J.P. Klostermann X6140 345-5598	4. J.D. Moore X1320 (805) 487-2880	1. J.D. Moore X1320 (805) 487-2880
5. R. Garcia X1329 341-3721	5. F.H. Badger X6585 994-5683	2. R.J. Tuttle X2726 785-8787
6. J.D. Moore X1320 (805) 487-2880	6. W.F. Heine X2746 998-8743	3. M.E. Remley X2238 349-6667
7. R.J. Tuttle X2726 785-8787	7. R.J. Tuttle X2726 785-8787	4. W.F. Heine X2746 998-8743
8. F.E. Begley X1320 349-0593		
9. L. Johnson X1329 480-1830		*Notify both Analytical Chemistry and Radiation and Nuclear Safety
10. E.L. Roddy X2727 347-5655		
11. M.E. Remley X2238 349-6667		
12. W.F. Heine X2746 998-8743		
13. V.J. Schaubert X1691 340-5629		

SERVICE ORGANIZATION

EMERGENCY PLAN

FACILITIES & INDUSTRIAL ENGINEERING

April 1976

APPROVALS:

*[Signature]*  
\_\_\_\_\_

*[Signature]* 7-18-76  
EMERGENCY COORDINATOR

*[Signature]* 4-12-76  
MANAGER, INDUSTRIAL SECURITY

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SECTION VII  
FACILITIES & INDUSTRIAL ENGINEERING

I. Responsibilities

II. Action Plans

- A. Bomb Threats, Civil Defense Warning, Closing of Plant
- B. Earthquakes
- C. Evacuation of Personnel
- D. Fires and Explosions
- E. Fuel, Electrical, Chemical Incidents
- F. Radiation Incidents
- G. Civil Disturbances, Recall of Personnel, Serious Illness/  
Injury Incidents
- H. Severe Weather

SECTION VII  
FACILITIES & INDUSTRIAL ENGINEERING

I. RESPONSIBILITIES

- A. Assemble Plant Services personnel in the Plant Services office.  
Establish and maintain communication with Industrial Security  
via emergency telephone. Dispatch personnel as instructed.
- B. Secure any utilities that may affect the incident.
- C. Barricade the immediate area as required.
- D. Clean and maintain emergency evacuation routes and assembly  
areas, both internal and external.
- E. Assure that adequate supplies and equipment related to incident  
are available.
- F. Establishment of tasks which should be performed and assign-  
ment of group responsibilities.

## II. ACTION PLANS

### A. BOMB THREATS

#### CIVIL DEFENSE WARNING

#### CLOSING OF PLANT

Action in the event of these incidents, which are indicative of potential bodily injury to personnel and potential damage to facilities, shall consist of the following:

1. Comply with the requests and instructions of Industrial Security.
2. Prepare for assisting in evacuation of personnel.
3. Prepare for emergency shut down of utilities supplying the facility.
4. Prepare for supplying emergency lighting and power for emergency work crew.

### B. EARTHQUAKES

1. Comply with requests and instructions of Industrial Security.
2. Assist in evacuating injured personnel to emergency evacuation stations.
3. Assist in securing all classified materials.
4. Isolate utilities supplying damaged building.
5. Provide emergency power and lighting.
6. Examine buildings and grounds for structural weaknesses, equipment hazards including falling live and exposed electrical wiring, escaping gas or dangerous chemicals, damaged bottles or tanks of flammable or toxic gases.
7. Examine plant and equipment to determine extent of damage and repair required.

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8. Make emergency corrections of unsafe conditions.
9. Establish salvage areas for relocating damaged equipment and tools.
10. Remove debris, cut openings through walls, floors and roofs and remove or break through jammed doors.
11. Provide rope and standards for barricades, materials for clean-up, recovery, repackaging and decontamination.
12. Prepare plan of action for restoration of facilities and equipment to normal operating conditions.

C. EVACUATION OF PERSONNEL

1. Comply with requests and instructions of Industrial Security.
2. Secure all classified material.
3. Shut down machinery and process equipment.
4. Barricade buildings under instruction of Industrial Security.

D. FIRES AND EXPLOSIONS

1. Comply with requests and instructions of Industrial Security.
2. Assist with evacuation of injured personnel.
3. Assist in securing all classified materials.
4. Close valves to isolate ruptured gas and/or domestic water lines.
5. De-energize electric circuits as required.
6. Assist in extinguishing fires as directed by the Fire Department.
7. Remove debris to an established salvage area.
8. Prepare plan of action for restoration of facilities and equipment to normal operating conditions.

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E. FUEL, ELECTRICAL, CHEMICAL INCIDENTS

1. Comply with requests and instructions of Industrial Security.
2. Assist in evacuation of injured personnel.
3. Assist in securing all classified materials.
4. Examine buildings and grounds for hazardous conditions, determine extent of damage and repair required.
5. Establish salvage areas and move damaged equipment into such areas.
6. Barricade buildings under instructions from Industrial Security.
7. If the incident is electrical in nature, Plant Services supervision will implement emergency electrical procedures as outlined in Plant Services Desk Instructions #11.
8. Prepare plan of action for restoration of facilities and equipment to normal operating conditions.

F. RADIATION INCIDENTS

1. Provide a Plant Services work team equipped with the following:
  - a. Protective clothing, shoe covers and personal film badges.
  - b. Rope and standards for barricades.
  - c. Auxilliary generator with extension cord and portable lights.
  - d. Emergency tool kit.
  - e. Materials for clean up, recovery, repackaging and decontamination.

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2. Comply with requests and instructions of Industrial Security and Health, Safety and Radiation Services personnel.

G. CIVIL DISTURBANCES

RECALL OF PERSONNEL

SERIOUS ILLNESS/INJURY INCIDENTS

1. Provide Plant Services work team.
2. Comply with requests and instructions of Industrial Security and Medical personnel.

H. SEVERE WEATHER

1. Provide Plant Services work team equipped with the following:
  - a. Protective clothing, foul weather gear.
  - b. Rope and standards for barricades.
  - c. Auxilliary generator with extension cords and portable lights.
  - d. Emergency tool kit.
  - e. Materials for clean up.
2. Examine buildings and grounds for structural damage, including falling live and exposed electrical wiring, escaping gas or dangerous chemicals.
3. Examine plant and equipment to determine extent of damage and repair required.
4. Make emergency corrections of unsafe conditions.
5. Establish salvage areas for relocating damaged equipment and tools.
6. Establish barricades of unsafe conditions which require greater than emergency corrections.

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APPENDIX

"A" - BOMB THREATS

"B" - AMBULANCE/HOSPITAL USE

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A-1-67

BOMB THREATS

Special Instructions for Switchboard Operators

Upon receipt of a bomb threat through the telephone switchboard, the operator will:

1. Treat the caller seriously and attempt to transfer the call to the Industrial Security Control Center. Should the caller object to the transfer, obtain without delay a location of the bomb.
  - a. Facility, building, floor, room, structure, etc.
  - b. What time the bomb is set for.
  - c. Special ways to identify the bomb.
2. Without jeopardizing the call, attempt to have another operator notify the Industrial Security Control Center that a bomb threat is in progress.
3. Make written notes while call is in progress.
  - a. Write each word if possible.
  - b. Listen for background noises; i.e., motors, music, voices, etc.
  - c. Note voice quality, speech, accent, gender, age, etc.
4. Re-attempt to refer the caller to Industrial Security Control Center. Failing this keep the caller on the line as long as possible with such questions as:
  - a. Does the caller represent an organization.
  - b. Why the Division was selected for bomb planting.
  - c. How the bomb was planted.
5. As soon as the caller leaves the line, the operator will:
  - a. Immediately report the bomb threat to the Industrial Security Control Center Operator.

F. F. Couture  
F. F. COUTURE  
Emergency Coordinator

Helen Cochran  
H. O. COCHRAN  
Chief Operator  
AI-76-21  
A-1-68

INDUSTRIAL SECURITY  
Bomb Threat Information

Date \_\_\_\_\_ Time of Call \_\_\_\_\_

Call Received By \_\_\_\_\_ Dept. \_\_\_\_\_ Ext. \_\_\_\_\_

Call Transferred to \_\_\_\_\_

RECORD EXACT LANGUAGE OF THREAT \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

WHAT FACILITY? Canoga \_\_\_\_\_ SSFL \_\_\_\_\_ Other \_\_\_\_\_

Where is Bomb? Building No. /Name \_\_\_\_\_ Floor \_\_\_\_\_

Room \_\_\_\_\_ Structure \_\_\_\_\_ Other \_\_\_\_\_

What Time is it Set For? \_\_\_\_\_

What Kind of Bomb? \_\_\_\_\_

Description of Bomb? \_\_\_\_\_

Why Did you Place the Bomb? \_\_\_\_\_

Who Are You? \_\_\_\_\_ Where Are You? \_\_\_\_\_

HOW WAS BOMB PLACED AT LOCATION? \_\_\_\_\_

Do You Represent an Organization? \_\_\_\_\_

VOICE ON TELEPHONE? Male \_\_\_\_\_ Female \_\_\_\_\_ Age \_\_\_\_\_

Accent \_\_\_\_\_ Speech Impediment \_\_\_\_\_

Voice Quality \_\_\_\_\_ Other \_\_\_\_\_

BACKGROUND NOISE? Music \_\_\_\_\_ Voices \_\_\_\_\_

Typing \_\_\_\_\_ Children \_\_\_\_\_ Traffic \_\_\_\_\_

Machines \_\_\_\_\_ Motors \_\_\_\_\_ Aircraft \_\_\_\_\_

Other \_\_\_\_\_



## Internal Letter

Rockwell International

Date . 17 February 1976

No. .

TO . Industrial Security Supervision

FROM . R. D. Barto

Address . 052 - All Locations

Address . 052 - 055, AA89

Phone . 2355

Subject . Ambulance/Hospital Use - (SUPERSEDES ALL PREVIOUS COMMUNICATIONS)

Contact for ambulance service or hospital use will be made in the order listed, in accordance with availability:

AMBULANCE SERVICE:DeSoto/Canoga

1. LAPD 785-2151
2. Snyder 785-3133
3. Schaefer's 781-0922

Santa Susana

1. Hocketdyne
2. Brady's (805) 527-1133
3. Snyder 785-3133
4. Schaefer's 781-0922

(NOTE: Request radiation cases to be transported to West Hills Hospital).

HOSPITAL USE:

Name	Phone	Address
1. West Hills	884-7060	7300 Medical Center Drive, Canoga Park
2. West Park	340-0580	22141 Roscoe Boulevard, Canoga Park
3. Northridge	885-8500	18300 Roscoe Boulevard, Northridge.

F. F. COUTURE  
Emergency Coordinator

APPROVED: \_\_\_\_\_

L. J. JOHNSON  
Medical Director

APPROVED: \_\_\_\_\_

R. D. BARTO  
Manager  
Industrial Security

RDB/lgk

CC: Control Center Operators - All Locations

Files: R-31-19

R-31-51

AI-76-21

A-1-70

APPENDIX A-2  
FACILITY EMERGENCY PLAN - OUTLINE

Building Number \_\_\_\_\_

Building Name \_\_\_\_\_

Location \_\_\_\_\_

Date : \_\_\_\_\_

APPROVALS:

\_\_\_\_\_  
Facility Manager

\_\_\_\_\_  
Health Safety

\_\_\_\_\_  
Vice President/Director

\_\_\_\_\_  
Emergency Coordinator

\_\_\_\_\_  
Manager, Industrial Security

AI-76-21  
A-2-1

1. Introduction

This plan provides specific instructions for actions to be taken during emergencies or disasters that occur in or near Building \_\_\_\_, \_\_\_\_\_. General instructions can be found in the Master Emergency Plan maintained by Industrial Security.

2. Emergency Team

A facility emergency team will be formed for the purpose of executing the actions required by this plan. The emergency team for Building \_\_\_\_ will consist of:

1. Team Captain

\_\_\_\_; \_\_\_\_; \_\_\_\_

2. #1 Alternate (The acting team captain will be the first available person in the sequence of this list).

\_\_\_\_; \_\_\_\_; \_\_\_\_

3. #2 Alternate

\_\_\_\_; \_\_\_\_; \_\_\_\_

4. Member (#3 alternate)

\_\_\_\_; \_\_\_\_; \_\_\_\_

5. Member (#4 alternate)

\_\_\_\_; \_\_\_\_; \_\_\_\_

6. Member (#5 alternate)

\_\_\_\_; \_\_\_\_; \_\_\_\_

AI-76-21  
A-2-2

The emergency team captain or acting team captain may appoint additional team members as appropriate to the situation.

### 3. Responsibility of Emergency Team

The emergency team will be responsible for the execution of the following general tasks:

- A. Notification of Industrial Security Control Center (X6244).
- B. Provide assistance as requested to Industrial Security personnel.
- C. Maintain liaison with Industrial Security.
- D. Insure protection of Classified material.
- E. Preserve the scene of serious incidents.
- F. Conduct fire-fighting activities.
- G. Open and close windows and doors as required.
- H. Direct evacuation of personnel.
- I. Shutdown test operations.
- J. Shutdown power and gas supply systems.
- K. Render first aid as required.
- L. Initiate personnel rescue operations.
- M. Facility damage inspections.
- N. Operation of ventilation system.

O. Conduct cleanup operations as required for chemical, radiation, or fuel incidents.

P. Preservation of personnel lists and visitor logs.

Specific actions are assigned to various team members in Appendix B. Additional specific tasks will be assigned to available team members by the team captain or acting team captain at the time of the incident.

#### 4. Action Plans for Emergency Situations

##### 4A. Bomb Threats

It is anticipated that bomb threats will generally be received by Industrial Security rather than by a specific facility. Upon receipt of such a threat, Industrial Security will notify the affected areas with instructions on what should be done.

Direct receipt of a threat by a facility will require the following actions:

##### 4A.1 Short Notice Threat (15 minutes or less)

Upon receipt of a threat that an explosive device will detonate within 15 minutes of the time of the call, the emergency team will:

A. Contact Industrial Security (X6244) to report the details of the threat.

B. Open all windows and doors if time permits. (See Appendix B)

C. Evacuate all personnel to the Emergency Assembly Area (EAA) #\_\_ located at Parking Lot #\_\_.

D. Remain assembled in the EAA until further instructions are received from Industrial Security.

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A-2-4

#### 4A.2 Long Notice Threat (30 minutes or more)

Upon receipt of a threat that an explosive device will be detonated more than 30 minutes after the time of the call; the emergency team will:

- A. Contact Industrial Security (X6244) to report the details of the threat.
- B. Warn all personnel about the threat (P.A. system).
- C. Request each employee to conduct a search of his work area for unidentifiable or unusual objects. Instruct employees not to disturb any such objects, but to report their presence to the Emergency Team Captain. A report will then be made to Industrial Security (X6244).
- D. The emergency team will conduct a search of the facility for unidentifiable or unusual objects and report their presence to Industrial Security.
- E. Shutdown test operations. (See Appendix C and D.)
- F. Shutdown gas and electrical power systems. (See Appendix A.)
- G. Open all windows and doors.
- H. Evacuate all personnel to Emergency Assembly Area (EAA) #\_\_\_\_, located at \_\_\_\_\_.
- I. Assemble at EAA and wait for further instructions from Industrial Security.

#### 4B. Civil Defense Warnings

When a civil defense warning is declared by the Office of Civil Defense, employees will be notified by Industrial Security. The following general

instructions will be followed, depending on if the civil defense warning was for a threat or act of war; or for an attack warning.

#### 4B.1 Threat or Act of War Notice

When Industrial Security announces that a threat or act of war has been made against the United States, employees will take the following actions:

- A. Secure all Classified materials in their regular depositories.
- B. Standby for further notices or instructions from Industrial Security.

#### 4B.2 Attack Warning - Take Cover

When an attack warning is announced by Industrial Security, the following actions will be accomplished by all employees:

- A. Shutdown operations as for the end of a shift.
- B. Secure all Classified materials in their regular depositories.
- C. Secure all hazardous materials in their work areas.
- D. Shutoff the electrical power and gas systems. (See Appendix A.)
- E. Take cover in the safest location in Building \_\_\_\_\_. (The safest location is \_\_\_\_\_).
- F. Employee's may leave the plant if desired. It will not be necessary to punch out.

G. Employees will be expected to return to work when an all-clear announcement is made by the Office of Civil Defense.

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A-2-6

4C Civil Disturbances (Includes strikes, riots, etc.)

Industrial Security will notify each facility as to the required actions to insure protection of personnel and equipment. All employees will take the actions specified by Industrial Security. In the event that a civil disturbance occurs in the vicinity of this facility, the following actions will be taken:

- A. Notify Industrial Security (X6244) of the extent of the disturbance.
- B. Secure Classified materials in their appropriate depositories.
- C. Standby for instructions from Industrial Security.

4D. Closing of Plant

A plant closing will only be ordered by Management or Industrial Security. Upon receipt of a notice of plant closing:

- A. Shutdown all operations as you would for a long weekend. (See Appendix C and D.)
- B. Secure all confidential materials in their appropriate depositories.
- C. All personnel will then leave in an orderly manner.

4E. Earthquakes

The action required after the occurrence of an earthquake will depend on the severity of the tremor. An earthquake will be considered mild if no apparent damage to structures or personnel injury has been noted. An earthquake will be considered as severe if either structural damage or personnel injury has been sustained. The actions required consist of:

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A-2-7

#### 4E.1 Mild Earthquakes

- A. Notify all personnel that smoking is prohibited.
- B. Inspect gas, power, water, sodium, radioactive, and alarm systems for damage.
- C. Shutdown systems and operations if the inspection reveals that continuance would pose facility or personnel hazards.
- D. Notify Industrial Security (X6244) of shutdowns and/or discovered damages.

#### 4E.2 Severe Earthquakes

- A. Assemble emergency team.
- B. Notify all personnel that smoking is prohibited.
- C. Start rescue operations of trapped personnel if required.
- D. Start fire-fighting activities if required.
- E. Evacuate all personnel to the EAA #\_\_\_\_, located at \_\_\_\_\_.
- F. Shut off power and gas systems. (See Appendix A.)
- G. Inspect building and systems for damage, shutdown as required and notify Industrial Security (X6244) of shutdowns and damages.

#### 4F. Evacuation of Personnel

Evacuation of personnel may be ordered by Management, Industrial Security or the Emergency Team Captain. The following general procedure will be followed in the event that a personnel evacuation is ordered:

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A-2-8

A. All employees will take car keys/wallet/purse/etc., to the EAA # \_\_, located at \_\_\_\_\_.

B. The emergency team captain will be responsible for bringing the list of personnel and the visitor log book to the EAA.

C. All employees will move to a secondary EAA if directed to by Industrial Security.

D. Employees will leave the plant in an orderly manner if directed by Industrial Security.

#### 4G. Fires - Explosives

The actions to be taken following the detection of a fire or explosion will be to:

A. Notify Industrial Security (X6244) as to the extent and type of fire and/or explosion.

B. Evacuate all personnel if hazardous conditions exist.

C. Start fire suppression action depending on the type of fire involved.

##### 1. Sodium Fires

a) Use full protective equipment when attempting to suppress a sodium fire.

b) Close all doors and windows if they are accessible.

c) Isolate leak by closing valves if possible.

d) Use only Na- for fire containment.

AI-76-21  
A-2-9

e) Inert gas (argon, helium, or nitrogen) may be used to smother fires in enclosed areas.

## 2. Major Sodium Spill

- a) Turn off all electrical power in the involved area.
- b) Use full protective equipment when in vicinity of the spill.
- c) Close all doors and windows if accessible.
- d) Isolate sodium source if possible.
- e) Use only Na-X for fire containment.
- f) Inert gas may be used to smother fires in enclosed areas.

## 3. Natural Gas Fires

Natural gas fires will be contained only by shutting off the source of the natural gas. NOTE: The maintenance department is the only agency authorized to turn the natural gas supply back on. Conventional methods are to be used to suppress auxiliary fires, resulting from a natural gas fire. See Appendix A for instructions on how to shut off natural gas supply system.

## 4. Electrical Equipment Fires

Containment of electrical equipment fires will be accomplished by:

- a) Shutting off electrical power to the equipment.
- b) Use CO<sub>2</sub> extinguisher to suppress flames.

## 5. Other Fires

The proper fire extinguisher will be used to suppress other types of fires such as gasoline or grease fires.

## 4. Fuel, Electrical and Chemical Incidents

These incidents consist of chemical spills, fuel spills, or power line incidents that present an explosion, fire, or toxicity hazard. The actions to be taken will vary depending on whether the incident occurs indoors or outdoors.

### 4H.1 Outdoor Incidents

If the incident occurs out of doors in the vicinity of the facility, the emergency team will:

A. Close all doors and windows.

B. At the discretion of the Team Captain or Facility Health Physicist shutdown the air conditioning and ventilation systems. (See Appendix A.)

C. Notify Industrial Security (X6244) of the type of incident and its location.

D. Remain indoors and wait for instructions from Industrial Security.

### 4H.2 Indoor Incidents

If the incident occurs indoors, the following actions will be required:

A. Notify Industrial Security (X6244) of the type of incident and its location.

B. Evacuate all personnel to the EAA #\_\_\_\_, located at \_\_\_\_\_, if explosion, fire, or toxicity hazard is present.

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A-2-11

C. Close all doors and windows.

D. Shutoff the power and gas supply systems.

E. The emergency team captain will coordinate any cleanup operations that may be required.

#### 4I. Radiation Incidents

The actions to be taken in the event of a radiation incident will vary depending on the location and type of alarm that is involved.

##### 4I.1 Radiation Release from an Adjacent Facility

The following actions will be taken if a radiation release occurs at an adjacent facility:

1. Notify Industrial Security (X6244) of the type and extent of the release involved.
2. If outdoors, go indoors and remain indoors.
3. Close all doors and windows.
4. Shutoff air conditioning and ventilation systems. (See Appendix A.)
5. Remain indoors until further instructions are received from Industrial Security.

##### 4I.2 Criticality Alarm (Siren)

Upon hearing a criticality alarm, the following actions are required.

1. Evacuate all personnel to EAA #\_\_, located at \_\_\_\_\_.
2. Account for all personnel in the facility.
3. Remain in EAA until further instructions are received from Security.

#### 4I.3 Airborne Monitor Alarm (Warbling Tone)

Upon hearing an airborne monitor alarm, the following actions are required:

1. Evacuate all personnel from the immediate area of the alarm.
2. Investigate the cause for the alarm.
3. Conduct appropriate recovery actions.

#### 4J. Recall of Personnel

Management will order the recall of personnel when the emergency situation no longer exists. A list of the personnel employed in Building \_\_\_\_ is located at \_\_\_\_\_. Industrial Security, a personnel department representative, the responsible manager, or the shift leader will call each person on the list with information as to when and where to report for work.

#### 4K. Serious Illness/Injury Incident

The following action is required in the event of serious illness or injury incident:

1. Notify Industrial Security (X6244) as to the nature and extent of the incident.

2. Do not move victim unless a hazardous environment is present.
3. Use a breathing apparatus if required.
4. Render first aid as required.

#### 4.1 Sodium Splash Victim

- 1) Remove coverall and any loose pieces of sodium.
- 2) Get victim into safety shower and flood with water.

#### 4.2 Electrical Shock Victim

- 1) Shutoff electrical power.
- 2) Remove victim from power source using insulating materials to avoid shock.

5. Preserve the scene of any serious incident until released by Industrial Security.

#### 4L. Severe Weather

In the event of high winds, extreme turbulence, heavy rains or violent electrical storms, the following actions will be taken:

1. Assemble the emergency team.
2. The emergency team will decide if operations are to be suspended on the basis of if their continuance would create significant personnel or equipment hazard. (See appendix A, C, and D for specific shutdown procedures).

3. Wind velocities may be obtained from Industrial Security (X6244). (Shutdown of operations will be required if the steady wind velocity exceeds 60 knots or if wind gusts of 75 knots are recorded.

#### APPENDIX A

A. Shutdown of air conditioning and ventilating equipment (emergency team member performs). Switch located \_\_\_\_\_.

B. Shutdown of natural gas supply. Natural gas supply will be turned off by closing main gas valve outside the building at \_\_\_\_\_. A wrench is at this location.

NOTE: Only the maintenance department may turn on gas after an emergency situation has been eliminated.

C. Shutdown of electrical power. Building power will be turned off by opening (main breaker) at \_\_\_\_\_. Opening of breaker will disrupt the fire alarm control circuit and initiate a firm alarm signal to the Industrial Security Control Center. Notify the control center or inform Industrial Security at the field command post at the emergency assembly area that the fire alarm warning was initiated manually.

D. Shutdown of Industrial Water Supply. Industrial water supply will not be turned off during an emergency. When the main power supply breaker was opened, the normal test equipment cooling water pumps were de-energized. When and if the seriousness of the emergency requires turning off of the industrial water supply, the main water supply valve location \_\_\_\_\_ will be closed.

#### APPENDIX B

##### ASSIGNED TASKS AND RESPONSIBILITIES

The following tasks and responsibilities are assigned to the named individual:

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A-2-15

1. Team Captain \_\_\_\_\_, X\_\_\_\_, \_\_\_\_\_

- A. Notification of Industrial Security (X6244).
- B. Maintain liaison with Industrial Security.
- C. Preserve the scene of serious incidents.
- D. Direct evacuation of personnel.
- E. Facility damage inspections.
- F. Preservation of personnel lists and visitor logs.

#1 Alternate \_\_\_\_\_, X\_\_\_\_, \_\_\_\_\_

- A. Insure protection of classified material.
- B. Direct first aid as required.

#2 Alternate \_\_\_\_\_, X\_\_\_\_, \_\_\_\_\_

- A. Shutdown test operations.
- B. Initiate personnel rescue operations.
- C. Close windows on north wall.
- D. Supervise cleanup operations.

Member \_\_\_\_\_, X\_\_\_\_, \_\_\_\_\_

- A. Close windows on south wall.
- B. Conduct fire-fighting activities.

Member \_\_\_\_\_, X\_\_\_\_, \_\_\_\_\_

- A. Close windows on east wall.
- B. Shutdown power and gas supply systems.

Member \_\_\_\_\_, X\_\_\_\_, \_\_\_\_\_

- A. Close windows on west wall.
- B. Operation of ventilation system.

## APPENDIX C

### FACILITY SHUTDOWN INSTRUCTIONS

Two types of facility shutdown are anticipated. A short time shutdown will consist of making the facility safe as for a long weekend. A long time shutdown implies that the facility is to be deactivated. It is also anticipated that some incidents will limit the time available to completely shutdown a given facility. Accordingly, the following list is to be completed in sequence, completing as many of the operations as time permits.

1. Short Term Shutdown

A.

B.

2. Long Term Shutdown

A.

B

## APPENDIX D

### SPECIAL SHUTDOWN INSTRUCTIONS



Rockwell International  
Aerospace International Division

## SUPPORTING DOCUMENT

NUMBER

NO01FEP870001

REV LTR/CHG NO.

SEE SUMMARY OF CHG

PROGRAM TITLE

Emergency Response Actions and Plans

DOCUMENT TYPE

Emergency Plan

KEY NOUNS

Bldg. 001

DOCUMENT TITLE

APPENDIX A-3

Facility Emergency Plan  
For the Fuel Area Of Bldg. 001

ORIGINAL ISSUE DATE

1-23-76

GO NO.

S/A NO.

PAGE 1 OF 15

TOTAL PAGES

Burden

REL. DATE

3-19-76nk

PREPARED BY/DATE

DEPT

MAIL ADDR

J. A. Fairris 1-23-76

784

KB43

SECURITY CLASSIFICATION

(CHECK ONE BOX ONLY)

(CHECK ONE BOX ONLY)

ERDA

DOD

RESTRICTED

UNCL ☐

☐

DATA ☐

CONF. ☐

☐

DEFENSE

SECRET ☐

☐

INFO. ☐

APPROVALS

DATE

AUTHORIZED  
CLASSIFIER

DATE

DISTRIBUTION

ABSTRACT

*	NAME	MAIL ADDR
*	D. Aubuchon	KB47
*	F. Couture (3) 055 AA87	
*	A. C. Crawford	KB08
*	T. L. Christy	MA12
*	R. Cunningham	KB43
*	W. Delozier	KB47
*	W. Dias	KB47
*	W. Elmstedt	KB47
*	G. Janis	KB08
*	E. Peters	KB47
*	M. Remley	KB08
*	R. Ruiz	KB47
*	F. Schrag (3)	KB43
*	A. Schultz	KB43

This plan provides specific instructions for actions to be taken during emergencies or disasters that occur in the Fuel Fabrication area of Bldg. 001, Canoga complex.

A facility emergency team will be formed for the purpose of executing the actions required by this plan.

PROTECTIVE SERVICES  
OFFICE

MAR 29 1976

RESERVED FOR PROPRIETARY/LEGAL NOTICES

AI-76-21  
A-3-1

\* COMPLETE DOCUMENT

NO ASTERISK, TITLE PAGE/SUMMARY  
OF CHANGE PAGE ONLY

FACILITY EMERGENCY PLAN

Building Number 001 Fuel Area

Building Name Manufacturing Bldg

Location Canoga Complex

Date 1-23-76

APPROVALS:

*[Signature]*  
Facility Manager

*[Signature]* 3/16/76  
Health, Safety and Radiation Services

*[Signature]* 3/1/76  
Director-Operations

*[Signature]* 3-17-76  
Emergency Coordinator

*[Signature]* 3/17/76  
Manager, Industrial Security

AI-76-21

A-3-2

1. Introduction

This plan provides specific instructions for actions to be taken during emergencies or disasters that may occur in the Fuel Area of Building 001, Canoga Complex. General instructions can be found in the Master Emergency Plan maintained by Industrial Security.

2. Emergency Team

A facility emergency team will be formed for the purpose of executing the actions required by this plan. The emergency team for this area will consist of:

A. Team Captain

D. Aubuchon (1st Shift) - Ext. 1667

B. #1 Alternate (The acting team captain will be the first available person in the sequence of this list.)

W. Dias (1st Shift) - Ext. 1667

C. #2 Alternate

E. Peters (1st Shift) Ext. 1667

D. Member (#3 Alternate)

W. Elmstedt (1st Shift) Ext. 1667

E. Member (#4 Alternate)

R. Ruiz (1st Shift) Ext. 1667

F. Member (#5 Alternate)

W. Delozier (1st Shift) Ext. 1667

The emergency team captain or acting team captain will appoint additional team members as appropriate to the situation.

AI-76-21  
A-3-3

2. Emergency Team (Cont'd)

When specific situations require, a reentry team will be formed as follows:

- A. No. 1 Team Captain  
Health Physicist
- B. No. 2  
Protective Services Representative
- C. No. 3  
Operations - Member of the Facility Emergency Team

Only emergency team members from Operations who satisfy the following qualifications can become a reentry team member and will be identified by (\*).

- A. Currently qualified for use of SCBA.
- B. No precluding medical or physical restrictions.
- C. Less than a fully accumulated lifetime radiation dose  
(5 (age -18) rem).

AI-76-21  
A-3-4

3. Responsibility of Emergency Team

The emergency team will be responsible for the execution of the following general tasks:

- A. Notification of Industrial Security Control Center (X3).
- B. Provide assistance as requested to Industrial Security personnel.
- C. Maintain liaison with Industrial Security.
- D. Preserve the scene of serious incidents.
- E. Assist in fire-fighting activities.
- F. Open and close windows and doors as required.
- G. Direct evacuation of personnel.
- H. Shutdown test operations.
- I. Shutdown power.
- J. Obtain first aid as required.
- K. Participate in personnel rescue operations.
- L. Facility damage inspections.
- M. Insure physical protection of special nuclear material in case of evacuation.
- N. Assist in cleanup operations as required for chemical, radiation, or fuel incidents.
- O. Accountability of personnel and assigned visitors.

Specific actions are assigned to various team members in Appendix B. Additional specific tasks will be assigned to available team members by the team captain or acting team captain at the time of the incident.

4. Action Plans for Emergency Situations

4A. Bomb Threats

It is anticipated that bomb threats will generally be received by Industrial Security rather than by a specific facility. Upon receipt of such a threat, Industrial Security will notify the affected areas with instructions on what should be done.

AI-76-21

A-3-5

4A. Bomb Threats (Continued)

Direct receipt of a threat by a facility will require the following actions:

4A.1 Short Notice Threat (15 minutes or less)

Upon receipt of a threat that an explosive device will detonate within 15 minutes of the time of the call, the emergency team will:

- a. Contact Industrial Security (X3) to report the details of the threat.
- b. Open all windows and doors if time permits.
- c. Secure all special nuclear material in their appropriate depositories.
- d. Evacuate all personnel to the Emergency Assembly Area (EAA) #1 located at the South East corner of Bldg. 004.
- e. Remain assembled at the EAA until further instructions are received from Industrial Security.

4A.2 Long Notice Threat (15 minutes or more)

Upon receipt of a threat that an explosive device will be detonated more than 15 minutes after the time of the call, Facilities will shutdown the air-conditioning and ventilating, natural gas supply, electrical power and water supply. The Emergency Team will:

- a. Contact Industrial Security (X3) to report the details of the threat.
- b. Warn all personnel about the threat (P.A. system).
- c. Request each employee to conduct a search of his work area for unidentifiable or unusual objects. Instruct employees not to disturb any such objects, but to report their presence to the Emergency Team Captain. A report will then be made to Industrial Security (X3).
- d. The Emergency Team will conduct a search of the facility for unidentifiable or unusual objects and report their presence to Industrial Security.
- e. Shutdown test operations. (See Appendix C.)
- f. Secure all special nuclear material in their appropriate depositories.

AI-76-21  
A-3-6

4A.2 Long Notice Threat (30 minutes of more) (Continued)

- g. Open all windows and doors.
- h. Evacuate all personnel to Emergency Assembly Area (EAA) #1, located at the South East corner of Bldg. 004.
- i. Remain assembled at EAA and wait for further instructions from Industrial Security.

4B. Civil Defense Warnings

When a civil defense warning is declared by the Office of Civil Defense, employees will be notified by Industrial Security. The following general instructions will be followed, depending on if the civil defense warning was for a threat or act of war; or for an attack warning.

4B.1 Threat or Act of War Notice

When Industrial Security announces that a threat or act of war has been made against the United States, employees will take the following actions:

- a. Standby for further notices or instructions from Industrial Security.

4B.2 Attack Warning - Take Cover

When an attack warning is announced by Industrial Security, the following actions will be accomplished by all employees:

- a. Shutdown operations as for the end of a shift.
- b. Secure all special nuclear material in their appropriate depositories.
- c. Secure all hazardous materials in their work areas.
- d. Take cover in the safest location in the Fuel Area of Bldg. 001. (The safest location is Room 1110-68 or 1110-73.)
- e. Employee's may leave the plant if desired. It will not be necessary to punch out.
- f. Employees will be expected to return to work when an all-clear announcement is made by the Office of Civil Defense.

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A-3-7

4C. Civil Disturbances (Includes strikes, riots, etc.)

Industrial Security will notify each facility as to the required actions to insure protection of personnel and equipment. All employees will take the actions specified by Industrial Security. In the event that a civil disturbance occurs in the vicinity of this facility, the following actions will be taken:

- 1) Notify Industrial Security (X3) of the extent of the disturbance.
- 2) Standby for instructions from Industrial Security.

4D. Closing of Plant

A plant closing will only be ordered by Management or Industrial Security. Upon receipt of a notice of plant closing:

- 1) Shutdown all operations as you would for a long weekend.  
(See Appendix C and D.)
- 2) Secure all special nuclear material in their appropriate depositories.
- 3) All personnel will then leave in an orderly manner.

4E. Earthquakes

The action required after the occurrence of an earthquake will depend on the severity of the tremor. An earthquake will be considered mild if no apparent damage to structures or personnel injury has been noted. An earthquake will be considered as severe if either structural damage or personnel injury has been sustained. The actions required consist of:

4E.1 Mild Earthquakes

- a. Notify all personnel that smoking is prohibited.
- b. Inspect gas, power, water, sodium, radioactive, and alarm systems for damage.
- c. Shutdown systems and operations if the inspection reveals that continuance would pose facility or personnel hazards.
- d. Notify Industrial Security (X3) of shutdowns and/or discovered damages.

AI-76-21  
A-3-8

4E.2 Severe Earthquake :

- a. Assemble emergency team.
- b. Notify all personnel that smoking is prohibited.
- c. Start rescue operations of trapped personnel if required.
- d. Assist in fire-fighting activities if required.
- e. Evacuate all personnel to the EAA #1, located at the South East corner of Bldg. 004.
- f. Shutdown test operations.
- g. Inspect building and systems for damage, shutdown as required and notify Industrial Security (X3) of shutdown and damages.

4F. Evacuation of Personnel

Evacuation of personnel may be ordered by Management, Industrial Security or the Emergency Team Captain. The following general procedure will be followed in the event that a personnel evacuation is ordered:

- 1) The Protective Services Officer will be responsible for bringing the list of personnel and the visitor log book to the EAA.
- 2) All employees will move to a secondary EAA if directed to by Industrial Security.
- 3) Secure all special nuclear material in their appropriate depositories.

4G. Fires - Explosives

The actions to be taken following the detection of a fire or explosion will be to:

- 1) Notify Industrial Security (X3) as to the extent and type of fire and/or explosion.
- 2) Evacuate all personnel if hazardous conditions exists.
- 3) Assist in fire suppression action depending on the type of fire involved.

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A. Sodium Fires

- (1) Use full protective equipment when attempting to suppress a sodium fire.
- (2) Close all doors and windows if they are accessible.
- (3) Isolate leak by closing valves if possible.
- (4) Use only Na-X for fire containment.
- (5) Inert gas (argon, helium, or nitrogen) may be used to smother fires in enclosed areas.

B. Major Sodium Spill

- (1) Turn off all electrical power in the involved area.
- (2) Use full protective equipment when in vicinity of the spill.
- (3) Close all doors and windows if accessible.
- (4) Isolate sodium source if possible.
- (5) Use only Na-X for fire containment.
- (6) Inert gas may be used to smother fires in enclosed areas.

C. Natural Gas Fires

Natural gas fires will be contained only by shutting off the source of the natural gas. NOTE: The Maintenance Department is the only agency authorized to turn the natural gas supply back on. Conventional methods are to be used to suppress auxiliary fires, resulting from a natural gas fire.

D. Electrical Equipment Fires

Containment of electrical equipment fires will be accomplished by:

- (1) Shutting off electrical power to the equipment.
- (2) Use CO<sub>2</sub> extinguisher to suppress flames.

E. Other Fires

The appropriate class fire extinguisher will be used to suppress other types of fires such as gasoline or grease fires.

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4H. Fuel, Electrical and Chemical Incidents

These incidents consist of chemical spills, fuel spills, or power line incidents that present an explosion, fire, or toxicity hazard. The actions to be taken will vary depending on whether the incident occurs indoors or outdoors.

4H.1 Outdoor Incidents

If the incident occurs out of doors in the vicinity of the facility, the emergency team will:

- a. Close all doors and windows.
- b. Notify Industrial Security (X3) of the type of incident and its location.
- c. Remain indoors and wait for instructions from Industrial Security.

4H.2 Indoor Incidents

If the incident occurs indoors, the following actions will be required:

- a. Notify Industrial Security (X3) of the type of incident and its location.
- b. Evacuate all personnel to the EAA #1, located at the South East corner of Bldg. 004, if explosion, fire, or toxicity hazard is present.
- c. Close all doors and windows.
- d. Shutdown test operations.
- e. The emergency team captain will coordinate any cleanup operations that may be required.

4I. Radiation Incidents

The actions to be taken in the event of a radiation incident will vary depending on the location and type of alarm that is involved.

4I.1 Radiation Release from an Adjacent Facility

The following actions will be taken if a radiation release occurs at an adjacent facility:

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4I.1 Radiation Release from an Adjacent Facility (Continued)

- a. If outdoors, go indoors and remain indoors.
- b. Close all doors and windows.
- c. Remain indoors until further instructions are received from Industrial Security.

4I.2 Criticality Alarm (Siren)

Upon hearing a criticality alarm, the following actions are required.

- a. Evacuate to EAA #1, located at the South East corner of Bldg. 004.
- b. The Protective Services Officer will insure that all visitor sign-in sheets and personnel lists are brought to the EAA.
- c. The emergency team captain will select reentry team member.
- d. Remain in EAA until further instructions are received from Security.

4I.3 Airborne Monitor Alarm (Warbling Tone)

Upon hearing an airborne monitor alarm, the following actions are required:

- a. Evacuate all personnel from the immediate area of the alarm.
- b. Notify Radiation Safety.

4J. Recall of Personnel

Management will order the recall of personnel when the emergency situation no longer exists. A list of the personnel employed in the Fuel Area is located at the Industrial Security Control Center. Industrial Security, a personnel department representative, the responsible manager, or the shift leader will call each person on the list with information as to when and where to report for work.

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4K. Serious Illness/Injury Incident

The following action is required in the event of serious illness or injury incident:

- 1) Notify Industrial Security (X3) as to the nature and extent of the incident.
- 2) Do not move victim unless a hazardous environment is present.

A. Sodium Splash Victim

- (1) Remove coverall and any loose pieces of sodium.
- (2) Get victim into safety shower and flood with water.

B. Electrical Shock Victim

- (1) Shutoff electrical power.

In the event electrical power cannot be shut off or you are not sure, remove victim from power source using insulating materials to avoid shock.

4L. Severe Weather

In the event of high winds, extreme turbulence, heavy rains or violent electrical storms, the following action will be taken:

- 1) Assemble the emergency team.
- 2) The emergency team captain will decide if operations are to be suspended on the basis of if their continuance would create significant personnel or equipment hazard. (See Appendix C and D for specific shutdown procedures.)
- 3) Contact Industrial Security (X3) for weather conditions and further instructions.

4M. Location of Incident

Preserve the scene of any serious incident until released by Industrial Security.

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APPENDIX A

ASSIGNED TASKS AND RESPONSIBILITIES

The following tasks and responsibilities are assigned to the named individual:

1. Team Captain D. Aubuchon (1st Shift) X-1667
  - A. Notification of Industrial Security (X3).
  - B. Maintain liaison with Industrial Security.
  - C. Preserve the scene of serious incidents.
  - D. Direct evacuation of personnel.
  - E. Facility damage inspections.
  - F. Accountability of personnel and assigned visitors.
  
- #1 Alternate W. Dias (1st Shift) X-1667
  - A. Replace team captain when captain is not present.
  - B. Insure protection of radioactive material.
  - C. Obtain first aid as required.
  
- #2 Alternate E. Peters (1st Shift) X-1667
  - A. Shutdown test operations.
  - B. Initiate personnel rescue operations.
  - C. Supervise cleanup operations.
  - D. Participate in personnel rescue operations.
  
- Member W. Elmstedt (1st Shift) X-1667
  - A. Shutdown test operations.
  - B. Assist in fire-fighting activities.
  - C. Participate in personnel rescue operations.
  
- Member R. Ruiz (1st Shift) X-1667
  - A. Shutdown test operations.
  - B. Assist in fire-fighting activities.
  - C. Participate in personnel rescue operations.
  
- Member W. Delozier (1st Shift) X-1667
  - A. Shutdown test operations.
  - B. Assist in fire-fighting activities.
  - C. Participate in personnel rescue operations.

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APPENDIX B  
FACILITY SHUTDOWN INSTRUCTIONS

Two types of facility shutdown are anticipated. A short time shutdown will consist of making the facility safe as for a long weekend. A long time shutdown implies that the facility is to be deactivated. Since the controls for the building are located outside the secured fuel area, Facilities will shutdown the following:

- A. Air conditioning and ventilating equipment.
- B. Natural gas supply.
- C. Electrical power.
- D. Industrial water supply.

APPENDIX C  
SPECIFIC SHUTDOWN INSTRUCTIONS

Emergency team members in their respective areas will generally shut down the following in specific emergency conditions:

- A. Fluorscope - ATR Rolling Area - Throw Switch 34 Panel 6 Buss 7
- B. X-Ray Machine - ATR Assembly Area - Room 1110-73 - Push Stop Button
- C. X-Ray Machine - EBR-II Assembly Area - Throw Switch so Identified in Panel 6 on X-Ray Booth Wall
- D. Radioisotope Model 627 - EBR-II Assembly Area - Push Retract Button on X-Ray Booth Wall

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**APPENDIX B**

**NPDES NO. CA0001309**

**Water Discharge Requirements for  
Rockwell International Corporation, Rocketdyne Division  
(Santa Susana Field Laboratory)**

State of California  
Resources Agency  
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, LOS ANGELES REGION

ORDER NO. 74-379

NPDES NO. CA0001309

WASTE DISCHARGE REQUIREMENTS  
FOR

ROCKWELL INTERNATIONAL CORPORATION, ROCKETDYNE DIVISION  
(Santa Susana Field Laboratory)

The California Regional Water Quality Control Board, Los Angeles Region, finds:

1. Rockwell International Corporation, Rocketdyne Division, has filed a Report of Waste Discharge and has applied for a permit to discharge wastes under the National Pollutant Discharge Elimination System.
2. Rockwell International Corporation, Rocketdyne Division, discharges up to 3,500,000 gallons per day of reservoir overflow into Bell Creek from two final storage ponds in its water reclamation system at its Santa Susana Field Laboratory in the Simi Hills. The wastes flow to the Upper Los Angeles River, a water of the United States, near the intersection of Bassett Street and Owensmouth Avenue in Canoga Park, above the tidal prism.
3. The Santa Susana Field Laboratory is a facility for research, development, and testing of rocket and jet engines. Water is used in test firings for flame bucket cooling, fire suppression, heat exchange equipment, and washdown. Both a fresh water and a reclaimed water system are utilized at the facility. Three packaged activated sludge sewage treatment plants which process all the sanitary wastes at the facility, discharge chlorinated effluents into the reclamation system. Excess water in the reclamation system results in an off-property discharge.
4. The water reclamation system consists of a series of 23 individual ponds and reservoirs throughout the facility. Ponds in test areas are lined with granite to prevent groundwater contamination and can be isolated from the rest of the system in order to chemically treat and neutralize any contaminants trapped therein. Discharge occurs from two final retention reservoirs only during and immediately after periods of extensive rainfall or during periods of prolonged testing. The discharge points are:

001	Lat. 34°12'29"	Long. 118°42'08"
002	Lat. 34°12'51"	Long. 118°42'16"
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5. Description of discharges:

Maximum flow -- 3,500,000 gallons per day

<u>Constituents</u>	<u>mg/l*</u>	<u>lb/day*</u>
BOD <sub>5</sub> 20°C	6	146
Suspended solids	30	875
Total dissolved solids	1,350	39,400
pH	8.1*	---

\* Average annual.

\*\* In pH units.

6. Periodic discharges from the Rockwell International Corporation, Atomics International Division facilities at the Santa Susana Field Laboratory to the Rocketdyne Division facilities water reclamation system, may contain minute quantities of radioactive materials. The exact nature of the material will vary due to the diversity of the research and development work performed at this facility. All effluents containing any such radioactive material are contained and tested prior to release so that concentrations at the point of entry to the Rocketdyne Division reservoirs do not exceed public health standards established in Title 17 of the California Administrative Code.
7. Effluents discharged from the Rocketdyne Division Propellant Research Area may contain trace quantities of certain toxic materials used in the manufacture and testing of various rocket fuels. These toxic materials include, but are not limited to, trace amounts of heavy metals, boron, and fluoride. These effluents are monitored carefully to prevent the discharge of excessive amounts of these materials.
8. On October 16, 1968, this Board adopted Resolution No. 58-77 prescribing requirements for this waste discharge. Resolution No. 58-77 was subsequently amended by Resolution No. 59-27, adopted April 7, 1969, and by Resolution No. 66-49, adopted on September 21, 1966.
9. The Board adopted an Interim Water Quality Control Plan for Santa Clara and Los Angeles River Basins on June 10, 1971, and updated that Plan on December 13, 1972. The Interim Basin Plan contains water quality objectives for surface waters of the Los Angeles River Basin.

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Rockwell International Corporation

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10. The beneficial uses of the receiving waters are as follows:  
municipal and domestic supply, water-contact recreation,  
groundwater recharge, non-water-contact recreation,  
fresh-water habitat, and (within the tidal prism) marine  
habitat and industrial supply.
11. Effluent limitation standards established pursuant to  
Section 301 of the Federal Water Pollution Control Act and  
amendments thereto are applicable to the discharge.

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The Board has notified the discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for this discharge and has provided them with an opportunity to submit their written views and recommendations.

The Board in a public hearing heard and considered all comments pertaining to the discharge and to the tentative requirements.

This Order shall serve as a National Pollutant Discharge Elimination System permit pursuant to Section 402 of the Federal Water Pollution Control Act, or amendments thereto, and shall take effect at the end of ten days from the date of its adoption, provided the Regional Administrator, EPA, has no objections.

IT IS HEREBY ORDERED, that Rockwell International Corporation, Rocketdyne Division, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, and the provisions of the Federal Water Pollution Control Act and regulations and guidelines adopted thereunder, shall comply with the following:

A. Effluent Limitations

1. Wastes discharged shall be limited to those described hereinabove.
2. The discharge of an effluent in excess of the following limits is prohibited:

Constituent	Discharge Rate (lbs/day)		Concentration Limit	
	Maximum		(mg/l)	
	Daily	30-Day Average	Average	Maximum
Total dissolved solids	29,200	29,200	---	1,000
Total hardness (as CaCO <sub>3</sub> )	14,600	14,600	---	500
Chloride	7,300	7,300	---	250
Chloride plus sulfate	14,600	14,600	---	500
Suspended solids	1,310	875	30	45
Settleable solids	---	---	0.1 <sup>1/</sup>	0.2 <sup>1/</sup>
BOD <sub>5</sub> 20°C	875	534	20	30
Oil and grease	438	292	10	15
Nitrate nitrogen	292	292	---	10
Color	---	---	---	20 <sup>2/</sup>
Turbidity	---	---	50 <sup>3/</sup>	75 <sup>3/</sup>
Total chromium	0.29	0.15	0.005	0.01

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- <sup>1/</sup> In ml/l.  
<sup>2/</sup> In color units.  
<sup>3/</sup> In turbidity units (TU).

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<u>Constituent</u>	<u>Discharge Rate (lbs/day)</u>		<u>Concentration Limit</u>	
	<u>Maximum</u>		<u>(mg/l)</u>	
	<u>Daily</u>	<u>30-Day Average</u>	<u>Average</u>	<u>Maximum</u>
Fluoride	29.2	29.2	---	1.0
Boron	29.2	29.2	---	1.0
Residual chlorine	---	---	---	0.5
Fecal coliform	---	---	200 <sup>4, 5/</sup>	400 <sup>4, 6/</sup>
Surfactants (as MBAS)	---	---	---	0.5

---

4/ In MPN/100 ml.

5/ 30-day average, geometric mean.

6/ 7-day average, geometric mean.

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Rocketdyne Division  
(Santa Susana Field Laboratory)  
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3. The daily discharge rate shall be obtained from the following calculation for any calendar day:

$$\text{Daily discharge rate} = \frac{8.34}{N} \sum_{i=1}^N Q_i C_i$$

in which N is the number of samples analyzed in any calendar day.  $Q_i$  and  $C_i$  are the flow rate (MGD) and the constituent concentration (mg/l) respectively, which are associated with each of the N grab samples which may be taken in any calendar day. If a composite sample is taken,  $C_i$  is the concentration measured in the composite sample and  $Q_i$  is the average flow rate occurring during the period over which samples are composited.

4. The 7-day and 30-day average discharge rates listed in item A2 above shall be the arithmetic average of all the values of daily discharge rate calculated using the results of analyses of all samples collected during any 7 and 30 consecutive calendar day periods, respectively. If fewer than four samples are collected and analyzed during any 30 consecutive calendar day period, compliance with the 30-day average rate limitation shall not be determined.
5. The pH of wastes discharged shall at all times be within the range 6.5 to 9.0.
6. The temperature of wastes discharged shall not exceed 100°F.
7. Wastes discharged shall not contain visible oil or grease, and shall not cause the appearance of grease, oil or oily slick, or foam in the receiving waters or on channel banks, walls, inverts or other structures.
8. Wastes discharged shall not cause the formation of sludge deposits.
9. Neither the disposal nor any handling of waste shall cause pollution or nuisance.
10. Wastes discharged shall not damage flood control structures or facilities.
11. This discharge shall not cause a violation of any applicable water quality standard for receiving waters adopted by the Regional Board or the State Water Resources Control Board as required by the Federal Water Pollution Control Act and regulations adopted thereunder. If more stringent applicable water quality standards are promulgated or approved pursuant to Section 303 of the Federal Water Pollution Control Act, or amendments thereto, the Board will revise and modify this Order in accordance with such more stringent standards.

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12. Sewage discharged to watercourses shall at all times be adequately disinfected. For the purposes of this requirement, the wastes shall be considered adequately disinfected if the median most probable number(MPN) of coliform organisms, at some point in the treatment, does not exceed 23 per 100 milliliters. The median value shall be determined from samples taken on at least one sampling day each week of discharge, collected at a time when wastewater flow and characteristics are most demanding on the treatment facilities and disinfection procedures.
13. The average final effluent concentrations shall not exceed 15 percent by weight of the average sewage treatment plant influent concentrations of BOD<sub>5</sub> 20°C and suspended solids during periods of discharge.
14. The wastes discharged shall not contain phenols, mercaptans, or other substances in concentrations which would impart taste, odors, color, foaming or other objectionable characteristics to receiving waters.
15. The wastes discharged shall not cause receiving waters to contain any substance in concentrations toxic to human, animal, plant, or fish life.
16. Radioactivity shall not exceed the limits specified in Title 17, Chapter 5, Subchapter 4, Group 3, Article 3, Section 30269, of the California Administrative Code.

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Rockwell International Corporation  
Rocketdyne Division  
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B. Provisions

1. This Order includes the following items of the attached "Standard Provisions": 1, 2, 4, 5, 6, 7, 8, 9, 10, and 11.
2. This Order includes the following items of the attached "Reporting Requirements": 1, 5, and 6.
3. This Order includes the attached "General Monitoring and Reporting Provisions."
4. This Order expires on September 26, 1976, and the discharger must file a Report of Waste Discharge in accordance with Title 23, California Administrative Code, not later than 180 days in advance of such date as application for issuance of new waste discharge requirements.
5. A copy of these waste discharge specifications shall be maintained at the discharge facility so as to be available at all times to operating personnel.
6. In the event of any change in name, ownership, or control of these waste disposal facilities, the discharger shall notify this Board of such change and shall notify the succeeding owner or operator of the existence of this Order by letter, copy of which shall be forwarded to the Board.
7. Any discharge of wastes at any point(s) other than specifically described in this permit is prohibited, and constitutes a violation of the permit.
8. The following resolutions are hereby rescinded:  
  
58-77, adopted October 16, 1958;  
59-27, adopted April 7, 1959;  
66-49, adopted September 21, 1966.

I, Raymond M. Hertel, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Los Angeles Region, on November 18, 1974.

  
RAYMOND M. HERTEL, Executive Officer

# CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

## LOS ANGELES REGION

### GENERAL MONITORING AND REPORTING PROVISIONS

#### GENERAL PROVISIONS FOR SAMPLING AND ANALYSIS

Unless otherwise noted, all sampling, sample preservation, and analyses shall be conducted in accordance with the current edition of "Standard Methods for the Examination of Water and Wastewater" or as approved by the Executive Officer.

All analyses shall be performed in a laboratory approved by the Executive Officer.

Effluent samples shall be taken downstream of any addition to the treatment works and prior to mixing with the receiving waters.

The discharger shall calibrate and perform maintenance procedures on all monitoring instruments and equipment to insure accuracy of measurements, or shall insure that both activities will be conducted.

A grab sample is defined as an individual sample collected in fewer than 15 minutes.

A composite sample is defined as a combination of no fewer than eight individual samples obtained over the specified sampling period. The volume of each individual sample is proportional to the discharge flow rate at the time of sampling. The sampling period shall equal the discharge period, or 24 hours, whichever period is shorter.

#### GENERAL PROVISIONS FOR REPORTING

For every item where the requirements are not met, the discharger shall submit a statement of the actions undertaken or proposed which will bring the discharge into full compliance with requirements at the earliest time and submit a timetable for correction.

By January 30 of each year, the discharger shall submit an annual report to the Board. The report shall contain both tabular and graphical summaries of the monitoring data obtained during the previous year. In addition, the discharger shall discuss the compliance record and the corrective actions taken or planned which may be needed to bring the discharge into full compliance with the waste discharge requirements.

The discharger shall maintain all sampling and analytical results, including strip charts; date, exact place, and time of sampling; date analyses were performed; analyst's name; analytical techniques used; and results of all analyses. Such records shall be retained for a minimum of three years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge or when requested by the Board.

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Monitoring reports shall be signed by:

- a. In the case of corporations, by a principal executive officer at least of the level of vice-president or his duly authorized representative, if such representative is responsible for the overall operation of the facility from which discharge originates;
- b. In the case of a partnership, by a general partner;
- c. In the case of a sole proprietorship, by the proprietor;
- d. In the case of municipal, state or other public facility, by either a principal executive officer, ranking elected official, or other duly authorized employee.

The discharger shall mail a copy of each monitoring report to:

Regional Administrator  
Environmental Protection Agency  
Region IX  
100 California Street  
San Francisco, CA 94111

Each report shall contain the following completed declaration:

"I declare under penalty of perjury that the foregoing is true and correct.

Executed on the \_\_\_\_\_ day of \_\_\_\_\_ at \_\_\_\_\_.

\_\_\_\_\_(Signature)

\_\_\_\_\_(Title)

In reporting the monitoring data, the discharger shall arrange the data in tabular form so that the date, the constituents, and the concentrations are readily discernible. The data shall be summarized to demonstrate compliance with waste discharge requirements, and, where applicable, shall include results of receiving water observations.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
LOS ANGELES REGION

REPORTING REQUIREMENTS

1. The discharger shall file with the Board technical reports on self-monitoring work performed according to the detailed specifications contained in any Monitoring and Reporting Programs as directed by the Executive Officer.
2. The discharger shall file a written report with the Board within 90 days after the average dry-weather waste flow for any month equals or exceeds 75 percent of the design capacity of his waste treatment and/or disposal facilities. The discharger's senior administrative officer shall sign a letter which transmits that report and certifies that the policy-making body is adequately informed about it. The report shall include:

Average daily flow for the month, the date on which the instantaneous peak flow occurred, the rate of that peak flow, and the total flow for that day.

The discharger's best estimate of when the average daily dry-weather flow rate will equal or exceed the design capacity of his facilities.

The discharger's intended schedule for studies, design, and other steps needed to provide additional capacity for his waste treatment and/or disposal facilities before the waste flow rate equals the capacity of present units. (Reference: Sections 13260, 13267(b), and 13268, California Water Code.)

3. The discharger shall notify the Board not later than 120 days in advance of implementation of any plans to alter production capacity of the product line of the manufacturing, producing or processing facility by more than ten percent. Such notification shall include estimates of proposed production rate, the type of process, and projected effects on effluent quality. Notification shall include submittal of a new report of waste discharge and appropriate filing fee.
4. The discharger shall notify the Board of (a) new introduction into such works of pollutants from a source which would be a new source as defined in Section 306 of the Federal Water Pollution Control Act, or amendments thereto, if such source were discharging pollutants to the waters of the United States, (b) new introductions of pollutants into such works from a source which would be subject to Section 301 of the Federal Water Pollution Control Act, or amendments thereto, if it were discharging such pollutants to the waters of the United States, (c) a substantial change in the volume or character of pollutants being introduced into such works by a source introducing pollutants into such works at the time the waste discharge requirements were adopted. Notice shall include a description of the quantity and quality of pollutants and the impact of such change on the quantity and quality of effluent from such publicly owned treatment works. A substantial change in volume is considered an increase of ten percent in the mean dry-weather flow rate. The discharger shall forward a copy of such notice directly to the Regional Administrator.

5. The discharger shall file with the Board a report on waste discharge at least 120 days before making any material change or proposed change in the character, location or volume of the discharge.
6. This Board requires the discharger to file with the Board, within 90 days after the effective date of this Order, a technical report on his preventive (fail-safe) and contingency (cleanup) plans for controlling accidental discharges, and for minimizing the effect of such events. The technical report should:

Identify the possible sources of accidental loss, untreated waste bypass, and contaminated drainage. Loading and storage areas, power outage, waste treatment unit outage, and failure of process equipment, tanks and pipes should be considered.

Evaluate the effectiveness of present facilities and procedures and state when they became operational.

Describe facilities and procedures needed for effective preventive and contingency plans.

Predict the effectiveness of the proposed facilities and procedures and provide an implementation schedule containing interim and final dates when they will be constructed, implemented, or operational. (Reference: Sections 13267(b) and 13268, California Water Code.

This Board, after review of the technical report, may establish conditions which it deems necessary to control accidental discharges and to minimize the effects of such events. Such conditions may be incorporated as part of this Order, upon notice to the discharger.

7. The discharger shall submit to the Board, by January 30 of each year, an annual summary of the quantities of all chemicals, listed by both trade and chemical names, which are used for cooling and/or boiler water treatment and which are discharged.
8. The discharger shall submit to the Board, together with the first monitoring report required by this permit, a list of all chemicals and proprietary additives which could affect this waste discharge, including quantities of each. Any subsequent changes in types and/or quantities shall be reported promptly.

# CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

## LOS ANGELES REGION

### STANDARD PROVISIONS

1. The requirements prescribed herein do not authorize the commission of any act causing injury to the property of another, nor protect the discharger from his liabilities under federal, state, or local laws, nor guarantee the discharger a capacity right in the receiving waters.
2. The discharge of any radiological, chemical, or biological warfare agent or high level radiological waste is prohibited.
3. The discharger shall require any industrial user of the treatment works to comply with applicable service charges and toxic and pretreatment standards promulgated in accordance with Sections 204(b), 307, and 308 of the Federal Water Pollution Control Act or amendments thereto. The discharger shall require each individual user to submit periodic notice (over intervals not to exceed nine months) of progress toward compliance with applicable toxic and pretreatment standards developed pursuant to the Federal Water Pollution Control Act or amendments thereto. The discharger shall forward a copy of such notice to the Board and the Regional Administrator.
4. The discharger shall permit the Regional Board:
  - (a) Entry upon premises in which an effluent source is located or in which any required records are kept;
  - (b) Access to copy any records required to be kept under terms and conditions of this Order;
  - (c) Inspection of monitoring equipment or records, and
  - (d) Sampling of any discharge.
5. All discharges authorized by this Order shall be consistent with the terms and conditions of this Order. The discharge of any pollutant more frequently than or at a level in excess of that identified and authorized by this Order shall constitute a violation of the terms and conditions of this Order.
6. The discharger shall maintain in good working order and operate as efficiently as possible any facility or control system installed by the discharger to achieve compliance with the waste discharge requirements.
7. Collected screenings, sludges, and other solids removed from liquid wastes shall be disposed of at a legal point of disposal, and in accordance with the provisions of Division 7.5 of the California Water Code. For the purpose of this requirement, a legal point of disposal is defined as one for which waste discharge requirements have been prescribed by a regional water quality control board and which is in full compliance therewith.

8. After notice and opportunity for a hearing, this Order may be terminated or modified for cause, including, but not limited to:
- (a) Violation of any term or condition contained in this Order;
  - (b) Obtaining this Order by misrepresentation, or failure to disclose all relevant facts;
  - (c) A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.
9. If a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Federal Water Pollution Control Act, or amendments thereto, for a toxic pollutant which is present in the discharge authorized herein and such standard or prohibition is more stringent than any limitation upon such pollutant in this Order, the Board will revise or modify this Order in accordance with such toxic effluent standard or prohibition and so notify the discharger.
10. There shall be no discharge of harmful quantities of oil or hazardous substances, as specified by regulation adopted pursuant to Section 311 of the Federal Water Pollution Control Act, or amendments thereto.
11. In the event the discharger is unable to comply with any of the conditions of this Order due to:
- (a) breakdown of waste treatment equipment;
  - (b) accidents caused by human error or negligence; or
  - (c) other causes such as acts of nature,

the discharger shall notify the Executive Officer by telephone as soon as he or his agents have knowledge of the incident and confirm this notification in writing within two weeks of the telephone notification. The written notification shall include pertinent information explaining reasons for the non-compliance and shall indicate what steps were taken to correct the problem and the dates thereof, and what steps are being taken to prevent the problem from recurring.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
LOS ANGELES REGION  
MONITORING AND REPORTING PROGRAM NO. 6027

FOR  
ROCKWELL INTERNATIONAL CORPORATION, ROCKETDYNE DIVISION  
(Santa Susana Field Laboratory)  
(CA0001309)

The discharger shall implement this monitoring program within 60 days of the effective date of this Order. Monitoring reports shall be submitted to the Board according to the following schedule:

<u>Reporting Period</u>	<u>Report Due</u>
July-September	October 15
October	November 15
November	December 15
December	January 15
January	February 15
February	March 15
March	April 15
April-June	July 15

The first monitoring report is due February 15, 1975. If no discharge has occurred during a reporting period, the report for that period shall so state.

Effluent Monitoring

A sampling station shall be established for each point of discharge and shall be located where representative samples of the effluent can be obtained. The following shall constitute the effluent monitoring program:

<u>Constituent</u>	<u>Units</u>	<u>Type of Sample</u>	<u>Minimum Frequency of analysis</u>
pH	pH units	grab	monthly
Temperature	°F	grab	monthly
Total waste flow	gal/day	continuous	---
Total dissolved solids <sup>1/</sup>	mg/l	grab	monthly
Total hardness (as CaCO <sub>3</sub> )	mg/l	grab	monthly
Chloride	mg/l	grab	monthly
Sulfate	mg/l	grab	monthly
Suspended solids	mg/l	grab	weekly
Settleable solids	ml/l	grab	weekly
BOD <sub>5</sub> 20°C	mg/l	grab	weekly
Oil and grease <sup>2/</sup>	mg/l	grab	weekly
Nitrate nitrogen <sup>3/</sup>	mg/l	grab	monthly
Color	color units	grab	monthly
Turbidity <sup>4/</sup>	TU	grab	weekly
Total chromium	mg/l	grab	monthly
Fluoride <sup>5/</sup>	mg/l	grab	monthly
Boron <sup>6/</sup>	mg/l	grab	monthly
Residual chlorine	mg/l	grab	weekly
Coliform group	MPN/100ml	grab	weekly
Fecal coliform	MPN/100ml	grab	weekly
Surfactants (as MBAS)	mg/l	grab	monthly
Radiation	PCI/l	grab	quarterly

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Monitoring and Reporting Program  
Rockwell International Corporation  
Rocketdyne Division  
(Santa Susana Field Laboratory) CA0001309

Influent Monitoring

A sampling station shall be established at the headworks of each sewage treatment plant on the facility where representative samples of sewage influent can be obtained. Influent monitoring is required only during discharge occurrences. The following shall constitute the influent monitoring program:

<u>Constituent</u>	<u>Units</u>	<u>Type of Sample</u>	<u>Minimum Frequency of Analysis</u>
BOD <sub>5</sub> 20°C	mg/l	grab	weekly
Suspended solids	mg/l	grab	weekly

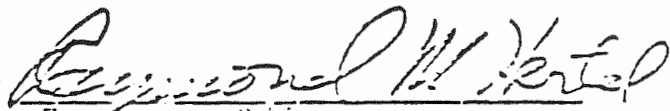
All records and reports are public documents and shall be made available for inspection during business hours at the office of the California Regional Water Quality Control Board, Los Angeles Region.

Operation and Maintenance Report

The discharger shall file a technical report with this Board not later than 30 days after receipt of this permit, relative to the operation and maintenance program for this waste disposal facility. The information to be contained in that report shall include, as a minimum, the following:

- The name and address of the person or company responsible for operation and maintenance of the facility.
- Type of maintenance (preventive or corrective).
- Frequency of maintenance, if preventive.

Ordered by

  
Executive Officer

NOV 18 1974

Date

- 1/ By glass fiber filtration with evaporation at 180°C.  
Reference: Methods for Chemical Analysis of Water and Wastes, 1971, Environmental Protection Agency (EPA Methods), p. 275.
- 2/ By the trichlorotrifluoroethane extraction method.
- 3/ By the calcium reduction or barium sulfate method.
- 4/ By means of a turbidimeter.
- 5/ By distillation and SPADNS method.

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## **APPENDIX C**

**Letter from C. C. Killingsworth  
(Consulting Geologist and Petroleum Engineer)  
and Geological Report**

## C. C. KILLINGSWORTH

CONSULTING GEOLOGIST & PETROLEUM ENGINEER

612 NORTH SEPULVEDA BOULEVARD  
LOS ANGELES 49, CALIFORNIA

November 12, 1958

North American Aviation Inc.  
International Airport  
Los Angeles 45, California

Attention: Mr. William C. Hobbs  
Assistant to Vice-President  
Administration

Gentlemen:

Submitted herewith is a report of my findings on the geological and hydrological conditions at P.F.I. as related to percolation on the area.

### CONCLUSIONS:

1. The ground water supply underlying the P.F.I. facility is completely contained by impervious barriers as a separate underground reservoir and is therefore not directly connected to the ground water in either Simi Valley or San Fernando Valley.
2. The water level measurements recorded over the past 10 year period have shown no influence of percolation from either rainfall, snowfall, stream runoff or percolation loss from small storage ponds located upon the property.
3. The quality of water contained in the surface ponds during the past 10 years is of considerable higher

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mineral content than the ground water. However, quality analyses of the water wells have shown no pattern of increase which can be directly traced to percolation loss from the ponds. It is interesting to note that the total dissolved solids in the well water varies from a high of 786 parts per million to a low of 345 parts per million.

4. Field tests made on a short term basis on the two large reservoirs and the impervious lined pond showed practically no percolation loss.

In summary, it is my opinion that the operations carried on in the past nine and one-half years and those carried on within the past six months by North American Aviation Inc. at the P.F.L. facility have not affected the quality of ground water produced from your wells. Furthermore, the same status of conditions should continue in the future operations.

The following report explains in detail the data used in making the conclusions herein.

Respectfully submitted,

C. C. Killingsworth

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## I. GEOLOGY

### GENERAL

Practically the entire property is underlain by the Chico formation, which is Upper Cretaceous in age. The formation consists predominately of buff to brown-colored, massive-bedded, coars to slightly pebbly sandstone with occasional beds of fine sandstone and thin beds of grayish micaceous shale.

The strike of the beds across the property ranges from N 60°E to N 85°E with all dips to the north varying from 20° to 35°. See Map I.

### HYDROLOGIC CHARACTERISTICS

The Chico formation is generally fairly well cemented throughout its entire thickness of 6,000 feet, more or less. The overall effective porosity is probably less than one percent. The ground-water in the Chico formation of the Simi Hills area appears to be concentrated in four types of occurrence.

- (1) Along fault planes where movement has caused fracturing of the sandstone.
- (2) Along joints and fractures which are not closely associated with faults, but are certainly related to the overall faulting of the area.
- (3) On bedding planes where there is a change of lithology of the formation.
- (4) In limited permeable zones in the sediments where original cementation of the grains has not been entirely effective.

The Chico formation as a whole is a very poor aquifer or water producing formation. Most of the formation shows evidence of secondary cementation which has decreased the original porosity to a very low capacity. The majority of the porosity in which water occurs in the formation is very closely associated with the fault planes, fractures and joints throughout the entire thickness of sediments.

## FAULT FLAWS

Field examination and photogeologic studies disclose numerous evidence of faults crisscrossing the Chico sandstones. The fault traces exhibit either a rhombic or a triangular, or less commonly, a wedgelike pattern, apparently due to the relief of stresses which accumulated over the entire area of Crotaceous outcrops during regional warping.

The rhombic fault pattern is commonest. The rhombs are bounded by sets of faults extending roughly from east to west and from northeast to southwest. These are the main faults of the area.

There is some evidence that the east-west faults slightly antedate those extending in a northeast-southwest direction, since the latter appear to offset the former in some, but not in all instances. The east-west faults have associated with them the greatest fracturing system and it is along these that better wells #5, #6, #12, and #13 have been developed.

A minor number of north-south cross-faults and a few lines of movement extending northwest and southeast have produced a few fault-blocks with triangular or trapesoidal outlines.

In a few instances, the dip of the fault planes possibly can be determined by following the sinuosity of the fault traces as they climb over ridges and descend into valleys. In these cases, the planes appear to have very high angles. Where the fault traces climb and descend hills in a straight line, the plane can be assumed to be vertical. The fault pattern indicates some diagonal movement may have taken place, so that there is probably a slight strike-slip component involved as well as a vertical component. Most faults within the area of sandstone outcrops appear to have moved distances measurable in tens, rather than in hundreds of feet. The faulting relieved local tensional stresses during the regional diastrophism and probably all faults are normal rather than reverse.

Erosion has been accelerated along most of the fault traces, indicating that the traces are open breaks and are not sealed by gouge or mylonite.

The criteria used in plotting the fault lines includes:

- (1) Linear topographic troughs or rifts
- (2) Discontinuity of strata along strike
- (3) Changes in strike of adjacent strata
- (4) Readjusted stream and valley patterns

### FRACTURES

The massive, hard, competent Chico sandstones develop a distinctive principal fracture pattern, generally parallel to, or slightly oblique to the direction of dip. These fractures appear to be much more abundant in areas cut by numerous faults than in relatively unfaulted areas. Of course, the relative thickness and competency of individual stratum will also influence its ability to fracture.

Secondary fracture systems, either at right angles, or oblique to principal fractures commonly break the sandstone strata into rectangular blocks, the size of which seems to be related to the thickness of each individual stratum. Some very thick, massive strata show very few fractures, but other sandstone layers may be broken into hundreds of blocks by the enlargement of dozens of fractures developed throughout the layers in a complex pattern.

### STRUCTURAL GEOLOGY

The geologic structure which holds the water at a 700 to 800 foot elevation above the surrounding valley floors is unique and quite unusual. The Cretaceous massive sandstone is bounded on the northwest, west and partially on the south by Eocene Age shales. A large fault trending east-west to the south apparently forms a seal in this direction. On the east escarpment of the Santa Susana Mountains, the northwesterly dip of the formations with interbedded thin shale members apparently forms the barrier on each stratum to retain the water within the Chico sandstones. The barrier on the north is not definitely known but it is most certainly there because a water well drilled about 7,000 feet northeasterly of the northwest corner of PFL property, about 2,400 feet up Black Canyon Road from Simi Valley, has a static water level of 865 feet above sea level, while PFL wells had static water levels from 1,430 to 1,630 feet above sea level. At this well the surface elevation is 1,625 feet above sea level

which is about 200 foot lower than wells at PFL, and the static water level is 760 feet below the surface. The lowest static water level at PFL is 480 feet from the surface.

The geologic barrier on the north has not been worked out in detail. It is the writer's opinion that the shale body in the Chico formation, which is found about 1,500 feet north of PFL property down Black Canyon Road, could be the barrier holding the water up on the PFL property. There is possible faulting which could also be associated with the barrier.

## II. WATER TABLE MEASUREMENT

Since the activation of the Propulsion Field Laboratory Facility, sixteen (16) wells have been drilled. With the activation of the first well in October 1948, water table measurements have been recorded on a weekly basis. During the ten (10) years of operation, the standing water level has dropped 285 feet (average of producing wells). At no time have the recorded water level measurements reflected the influence of replenishment from percolation. In normal areas which have aquifer conditions connecting the surface with the zone of saturation, replenishment of the ground-water supply through percolation from rainfall, snowfall, storm runoff and impounding basins is reflected in a seasonal rise of the ground-water table.

The continual drop of the water level through the ten (10) years of operation at the Propulsion Field Laboratory is directly proportional to the amount of water extracted. All evidence obtained through measurements of the standing water level indicates that the water bearing fractures and joints are completely contained by impervious members.

## III. GROUND-WATER QUALITY ANALYSES

Samples taken from active wells have been submitted to outside laboratories periodically for complete mineral analysis. This provides another means through which we can evaluate the influence of percolating water. Examination of these reports shows no appreciable change in mineral concentrations.

Until approximately six (6) months ago, there was little being added to the industrial effluent that would tend to change the mineral concentration of the water. During the past six (6) months, however, large concentrations of nitrates ( $\text{NO}_3$ ) have been retained in the primary basins. Since nitrates have always been low or completely absent in previous tests on well samples, they should provide a good indicator. Samples were taken October 31, 1976 in all active wells, the results showed no nitrates in all wells except Well 9A which had 2.0 ppm (lab results are shown on the following pages). This concentration of 2.0 ppm is below previous recorded concentrations on well samples.

This indicates that percolation from these retention basins during the past six (6) months has not shown any influence in the quality of the groundwater.

Nitrates

ppm

Well #5	0.0	( $\text{NO}_3$ )
Well #6	0.0	( $\text{NO}_3$ )
Well #7	0.0	( $\text{NO}_3$ )
Well #8	0.0	( $\text{NO}_3$ )
Well #9A	2.0	( $\text{NO}_3$ )
Well #11	0.0	( $\text{NO}_3$ )
Well #12	0.0	( $\text{NO}_3$ )
Well #13	0.0	( $\text{NO}_3$ )



## Rockwell International

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